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ASTOUNDING

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Science-Fiction

JANUARY 1946
25 CENTS

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AIRY
HESSMEN
LEWIS PADGETT

V36 5 JAN 46
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Invite *Him?*—Over My Dead Body!

Debbie was right. Chuck was a swell kid, but at a real nice party he would simply be excess baggage. Of late he had been pretty careless about a rather important thing, and the news got around fast. Lots of the girls considered a dance with him equivalent to a prison sentence. Too bad somebody didn't tip him off*!

Take your own case . . . are you sure that your breath isn't on the offensive [illegible]?

[illegible]hy guess about it*. . . why risk [illegible]ding when Listerine Antiseptic pro[illegible]s such an easy and delightful pre[illegible]

Simply rinse the mouth with Liste Antiseptic before any date where want to be at your best. How quick freshens . . . what a wonderful feelin assurance it gives you!

While some cases of halitosis ar systemic origin, most cases, say a nu ber of authorities, are due to the b terial fermentation of tiny food parti clinging to mouth surfaces. Liste Antiseptic halts such fermentation, t overcomes the odors fermentat causes. Almost immediately your br becomes sweeter, fresher, less likel offend.

LAMBERT PHARMACAL COMPANY, *St. Louis*

1946
1

38-5

Straight Talk from Santa!

"This year, more than ever before, I hope every package on my sled is festooned with Christmas Seals!

"I figure that makes it a double gift—a gift to all mankind. You see, *these seals save lives*—make possible a year-round program against tuberculosis.

"The need this year is greater than ever before. So that's why I say *make every package and letter count.* And—be sure to send in your contribution!

"Merry Christmas!"

1945
GREETINGS

BUY CHRISTMAS SEALS

Because of the importance of the above message, this space has been contributed by

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ASTOUNDING SCIENCE FICTION

Reg. U. S. Pat. Off.

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NEXT ISSUE ON SALE JANUARY 15, 1946

"—but are we?"

The best newspaper editorial so far published on the atomic bomb observes, cogently, that "The atomic bomb is here to stay—but are we?"

It seems to most science-fictionists that the answer to that is that the human race is here to stay; the individuals are too small, too numerous, and too scattered to be found and destroyed by atomic bombs. But that, as things stand, President Truman was wrong in saying that the *next* war using atomic bombs would end our civilization. The civilization is already ended. Unless we can produce an adequate defense against the atomic bomb within the next five years, there is a very real chance of an atomic war breaking out in about that length of time.

Why?

Basically, our whole cultural pattern is rooted in the firm and oft-proven belief that a good big nation can lick a good little nation any day in the week, and twice on February 29th. Japan made a try at disproving it; for that imprudent gesture she was rewarded with the world's first atomic bomb, after a severe preliminary mauling with battleships, aircraft, submarines, and assorted technological weapons she could match neither in quantity nor quality.

The San Francisco United Nations charter accepted that as a basic fact of life; the Council of the Big Five has special prerogatives for the perfectly obvious reason that a good big nation can lick a good little nation.

Once upon a time a good big man could lick a good little man any time, so a man who stood four feet eleven had to be very careful of his manners in talking to a man who stood six feet four, and made his living playing the anvil chorus with a twenty-pound hammer.

Then somebody invented the revolver—and the six-foot-four man had to have just as good manners to the four-foot-eleven man as the little man needed around the big man. The good little man was just exactly as deadly as the good big man. Our present social set-up involves the background proposition that extremely deadly, handy weapons make all individuals equal.

The atomic bomb will make all nations approximately equal in size. Belgium, for example, is several sizes larger than Russia or the United States; Belgium owns more of the world's known uranium. At present, Belgium doesn't have atomic bomb plants, but Belgium is a highly industrialized, and thoroughly technical nation. When Belgium—or Holland, Switzerland, Yugoslavia, Czechoslovakia or what have you—gets the atomic bomb, it will be perfectly evident that she joins the ranks of the Big Five. If Czechoslovakia or Holland gets the answer before Russia by some chance, Holland or whatever will, obviously, be more deadly as a world power than Russia. The small, not the big, nation will, therefore, belong to the select group of ruling powers.

The situation will, of course, last for a very short time. In a few years, every nation will have it. At the moment, our relations with Argentina are strained. There are a lot of Nazis in Argentina; the Nazis had done a great deal of atomic research. Suppose one of them comes up with the answer, and equips Argentina. How would the United States foreign policy with respect to Argentina be altered?

Again, that's temporary. The situation as of about five years hence will probably find all the industrialized nations of the Earth adequately equipped.

That will call for a total reorganization of thinking. The smallest nation so equipped must be handled with the same high regard that is displayed toward the largest; each is equally deadly. If the hot-headed, emotional, illogical, greedy, egoistic, prideful members of the human race succeed in weathering that time of crisis without somebody, somewhere, getting overexcited and shooting off a few rocket-driven robot atomic bombs at somebody else, it will be a Grade-A miracle. Imagine the chances of world peace if each of the Balkan nations is equipped with atomic bombs! And, be it remembered, no "big" powers exist under that regime; the big powers can no more arbitrate the differences than the bystanders in the saloons of the old West could arbitrate a gun fight. That just leads to bystanders getting plugged.

A *real* defense against the atomic weapon is needed. It has been reported that the Crosby Foundation has developed a method of detonating the bomb at a distance. Maybe so. The next question is, of course, whether or not a screening can be developed that blocks that detonation effect, and so allows the bomb to penetrate.

There is also this point; presumably, if there were danger of atomic bombardment, the devices which detonate atomic bombs would be turned on, as a precautionary measure. It has been stated that this device—whatever its nature—can detonate the atomic bomb, even when its exact location is not known. It suggests a broadcast energy wave which can set off the bombs.

Now if I were planning an attack on an enemy nation which had such a bomb defense, I would ship a few hundred cases of canned milk, or raw silk, or toys, or something—with one case full of an atomic bomb. Then when the war tension reached the proper pitch, and he turned on his bomb-detonator, he would save me the trouble of rocketing atomic bombs over to his cities. His defensive detonator would set off the pre-planted atomic bombs in the warehouses in his cities. It just seems to me that would be a fairly practical way—

In any case, there remains the use of the radioactive dusts produced in quantities, as by-products, in the operation of a uranium pile. Those can't be detonated, and in their own awful way, they are even more ghastly than the atomic bomb—which is, at least, a quick, clean death for nearly everyone effected.

Subterranean cities are futile. The uranium reaction is reasonably potent, but another one, discovered in 1930 by Lord Rutherford, is nearly twice as powerful, pound for pound, and uses cheap lithium and ordinary hydrogen. It won't start until a temperature of several million degrees is reached, but the Hiroshima U-235 bomb would make an excellent primer to start the more violent explosion. If a city plays hard to get, the bombs will simply be stepped up to get it.

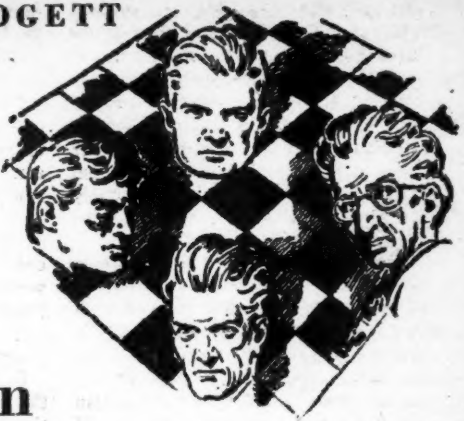
By spending $2,000,000,000, the United States bought the atomic bomb. Other nations can get it much more cheaply, now the spade work has been done. Probably two new battleships would buy a functioning uranium pile.

The secret of the atomic bomb is not an American, or an Anglo-American secret; it's Nature's secret—and Nature is a blabber-mouth. She'll tell anyone who asks the right questions.

For approximately $1,000,000,000 the

(*Continued on page 117*)

by LEWIS PADGETT



The Fairy Chessmen

First of two parts.

The weirdest weapon ever conceived attacked not the mighty defensive screens, but the defending technical minds. It was a simple idea—but simply devastating. All it did was deny the basis of the scientific method!

Illustrated by Orban

I.

The doorknob opened a blue eye and looked at him. Cameron stopped moving. He didn't touch the knob. He pulled back his hand and stood motionless, watching.

Then, when nothing happened, he stepped to one side. The black pupil of the eye swiveled in that direction. It watched him.

Deliberately he turned his back and walked slowly toward a window valve. The circular pane lightened to transparency as he approached. In a moment he stood before it, two fingers checking his pulse beat, while he automatically counted his respiration.

The window showed a green, rolling countryside, checkered with the shadows of drifting clouds. Golden sunlight brightened the spring flowers on the slopes. A helicopter moved silently across the blue sky.

The big, gray-haired man finished checking his pulse and waited, not wanting to turn around just yet. He stared at the peaceful landscape. Then, with a faint sound of impatience, he touched a stud. The pane swung aside into the wall.

Beyond the gap was red darkness, and the sound of thunder.

Shapes swam out of the gloom of the underground city, immense, blocky colossi of stone and metal. Somewhere a deep, rhythmic breathing made a distant roar; a mechanical rales rasped in the titan pump's beat. Static lightnings flickered occasionally, their duration too brief to show much of Low Chicago.

Cameron leaned forward, tilting his head back. Far above he could see only a deepening of the shadow, except when the necklaces of pallid lightning raced across the stone sky. And below was nothing but a pit of blackness.

Still, this was reality. The solid, sensible machines in the cavern made a sound foundation to logic, the logic on which the world was built today. A little heartened, Cameron drew back and closed the pane. Again blue skies and green hills were apparently outside the window.

He turned. The doorknob was a doorknob, nothing more. It was plain, solid metal.

He rounded the desk and walked quickly forward. His hand reached out and closed firmly on the metal.

His fingers sank into it. It was half-solid jelly.

Robert Cameron, Civilian Director of Psychometrics, went back to his desk and sat down. He pulled a bottle from his desk and poured himself a shot. His gaze wasn't steady. It kept shifting around the desk, never settling steadily on any one object. Presently he pushed a button.

Ben DuBrose, Cameron's confidential secretary, came in, a short, heavy-set man of thirty, with pugnacious blue eyes and untidy taffy-colored hair. He seemed to have no trouble with the doorknob. Cameron didn't meet the gaze of those blue eyes.

He said sharply, "I just noticed my televisor's off. Did you do that?"

DuBrose grinned. "Why, chief—it doesn't matter, does it? All the incoming calls come through my board anyway."

"Not all of them," Cameron said. "Not the ones from GHQ. You're getting too smart. Where's Seth?"

"I don't know," DuBrose said, frowning faintly. "Wish I did. He—"

"Shut up." Cameron had turned the visor to Receive. A hysterical buzzing sounded. The director looked up accusingly. DuBrose noticed the lines of tension about the older man's eyes, and cold, frantic panic struck into his stomach. He wondered if he could smash the visor—but that wouldn't help now. *Where was Seth?*

"Scrambler," a voice said.

"Scrambler on," Cameron grunted. His strong, big-knuckled hands moved lightly over switches. A face checkered in on the screen.

The Secretary of War said, "Cameron? What's wrong with that office of yours? I've been trying to locate you—"

"Well, now you've got me. Since you're using this call number, it must be important. What's up?"

"I can't tell you over the visor.

Not even through the scrambler. Perhaps I made a mistake in explaining as much as I did to your man—DuBrose. Is he trustworthy?"

Cameron met DuBrose's blank stare. "Yes," he said slowly. "Yes, DuBrose is all right. Well?"

"I'll have a man pick you up in half an hour. There's something I want you to see. Usual precautions. This is priority emergency. All right?"

"I'll be ready, Kalender," the director said, and broke the contact. He laid his hands flat on the desk and watched them.

"All right, have me court-martialed," DuBrose said.

"When did Kalender drop in?"

"This morning. Look, chief—I've got a reason. A good one. I tried to explain it to Kalender, but he's a brass hat. I didn't have enough stars on my shoulder to impress him."

"What did he tell you?"

"Something I don't think you should know yet. Seth would back me up on that, too. You'd trust him. And—look, I passed my psych tests with honors or I wouldn't be here with you. There's a psychological problem here and the factors indicate that you shouldn't know the set-up until—"

"Until what?"

DuBrose bit a thumbnail. "Anyway till I check with Seth. It's important that you shouldn't get mixed up in this affair right now. The whole thing's paradoxical. I may be all wrong, but if I'm right—you don't know how right that is!"

Cameron said, "So you think Kalender's making a mistake in approaching me directly. Why?"

"That's exactly what I don't want to tell you. Because if I did, it would—screw things up."

Cameron sighed and rubbed his forehead. "Forget it," he said, his voice tired. "I'm the guy in charge of this department, Ben. It's my responsibility." He stopped and looked sharply at DuBrose. "That word must have a plenty high emotional index to you."

"What word?" DuBrose said flatly.

"*Responsibility*. You reacted plenty."

"A flea bit me."

"So. Well, it's the truth. If there's a priority emergency in psych, it's my business to know about it. The war won't stop while I take a recess."

DuBrose picked up the bottle and shook it.

"Buy yourself one," Cameron said, shoving the cup forward. The secretary poured out amber fluid. He managed to drop the pill into the whiskey without attracting Cameron's attention.

But he didn't drink. He lifted the cup, sniffed, and set it down again. "Too early for me, I guess. I do my best drinking at night. Do you know where I can reach Seth?"

"Oh, shut up," Cameron said. He sat staring at the cup without seeing it. DuBrose went to the window and looked at the projected landscape there.

"Looks like rain."

"Not under *here,*" Cameron said. "Nohow."

"On the surface, however . . . look. Let me go along, anyhow."

"No."

"Why not?"

"Because you make me sick," Cameron said tersely. DuBrose shrugged and went out. As he reached for the doorknob he felt the director's eyes upon him, but he didn't turn.

He went quickly to the communications board, ignoring the receptive smile of the girl who sat before the flickering panel.

"Get hold of Seth Pell," DuBrose said, curiously conscious of the tone of flat hopelessness in his voice. "Try everywhere. Keep trying."

"Important?"

"Yeah . . . plenty!"

"General broadcast?"

"I . . . no," DuBrose said. He ruffled his yellow hair distractedly. "I can't. No authorization. You'd think those pot-heads in charge would allow for—"

"The chief would O.K. it."

"That's what you think. No dice, Sally. Just try your best, that's all. I may be going out, but I'll call back. Find out where I can reach Seth, anyhow."

"Something must be up," Sally hinted. DuBrose gave her a thin, crooked smile and turned away. Praying silently, he went back to Cameron's office.

The director had the window open and was staring out at the red-lit darkness. DuBrose slanted a quick glance at the desk. The cup was empty of whiskey, and an uncontrollable tremor of relief shook him. Though even now—

Cameron didn't turn. He said, "Who is it?" A layman would not have noticed a difference in the director's voice, but DuBrose was no layman. He could tell that the alkaloid had already reached Cameron's brain, via the bloodstream.

"It's Ben."

"Oh."

DuBrose watched the slight swaying of the big figure at the window. That should wear off soon, though. The disorientation period was very brief. He blessed the lucky chance that he had had a package of Pix in his pocket. Not that it was a coincidence; most warmen carried them. When you work on desperately overtime schedules, the slow process of getting drunk is a nuisance and hangovers are an occupational risk. Some bright chemist had taken time off to fool around with alkaloids and create Pix, tiny, tasteless pills that had all the impact of 100 proof Scotch. They created and maintained that roseate glow of synthetic euphoria which has been popular since man first noticed grapes fermenting. It was one of the reasons why war workers were willing to plug away at their interminable jobs indefinitely, in the long deadlock that had existed since both nations decentralized and dug in. The population in general, oddly enough, seemed to live a more secure and contented life than before the war; the actual job of battle planning and operation was limited to GHQ and its subsidiaries. In extremely specialized warfare, there is room only for specialists, especially since neither country used troops any more. Even PFCs were made of metal.

The set-up would have been impossible without the booster charge of World War II. As the first World War had stimulated the use of air power in the second interglobal conflict, so the war of the nineteen-forties had stimulated the techniques of electronics—among other things. And when the first blasting attack of the Falangists, on the other side of the planet, had come, the western hemisphere was not only prepared, but could work its war machine with slightly miraculous speed and precision.

War needs no motive. But probably imperialism, as much as anything, was the motive behind the Falangists' attack. They were a hybrid race, as Americans had once been; a new nation that had arisen after World War II. The social, political and economic tangle of Europe had ended in a free state, a completely new country. The blood of a dozen races, Croats, Germans, Spanish, Russian, French, English, mingled in the Falangists. For the Falangists were *émigrés* from all Europe into a new free state with arbitrary and well-guarded borders. It was a new melting-pot of races.

And, in the end, the Falangists unified, drawing their name from Spain, their technology from Germany, and their philosophy from Japan. They were a melange as no other nation had ever been: black, yellow and white stirred up together in a cauldron under which a fire had been kindled. They spoke of a new racial unity; their enemy called them mongrels, and it was impossible to decide. Once American colonizers had pioneered westward. But there were no new lands for the Falangists.

So the last two great nations of the world had been locked for decades in a see-saw war, each with a knife against the other's armored throat. The social economy of both countries had gradually adjusted to war conditions—which led to such developments as Pix!

Morale Service, backed by Psych, had sponsored Pix. And there were plenty of other quick-action surrogates that kept the war workers happy. Like the Creeps, as someone had irreverently dubbed the subjective movies, with their trigger-action emotional shocks. And Deep Sleep, and the Fairylands that could partially compensate for the lack of children or pets—or could even act as a psychological curative. Few men could keep an inferiority complex when he could be Jehovah to a fantastically convincing illusion of a little world of his own, peopled with critters he could design and create himself. They weren't alive; they were simply gadgets; but so intricately constructed that many a man, watching a Fairyland come alive under his guiding hands on the controls, had found it difficult to come back to the real world. As an escape mechanism, the devices were plenty useful.

DuBrose watched Cameron. He wanted to make his point before the disorientation wore off.

"We'd better get ready."

"We?"

DuBrose put surprise in his voice. "Changed your mind? Don't you want me to go along, then?"

"Oh. Did I . . . I thought—"

"Better not keep the window open. We might get some fumes in while we're gone."

"No dangerous gases in Low Chicago," Cameron said, taking it for granted that DuBrose was to accompany him. "Not even in the Spaces."

"Well, there are some mighty strong stinks," DuBrose said.

"An underground city—"

"I know. No matter how high-grade the technics are worked out, it's still underground. But you're the man who made the plans for the scanner windows in the first place. Why not use 'em?"

Cameron swung the pane back into place and stared at the green hillside, shadowed now under thickening rain-clouds. "Claustrophobia isn't my weakness," he said. "I can spend months underground without getting bothered."

"That's more than I can do." DuBrose noticed that Cameron held his ersatz liquor well. That was fine; he hadn't hoped that the director would pass out. His plan was set for a longer range. Probably the emissary from the Secretary of War wouldn't even notice Cameron's euphoria. He reminded himself to feed the chief a breath-purifier before—

He managed it just in time. A thin, sour-looking man with two weapons strapped to his waist was ushered in, after the precautionary identifications.

"Name's Locke," he said. "Ready, Mr. Cameron?"

"Yes." The director was reoriented again. "Where are we going?"

"Sanatorium."

"Surface?"

"Surface."

Cameron nodded and started toward the door. Then he paused, frowning a little.

"Well?" he said.

"Sorry." Locke opened the door and let Cameron precede him. When DuBrose followed, the government man barred his path.

"You're not—"

"It's all right."

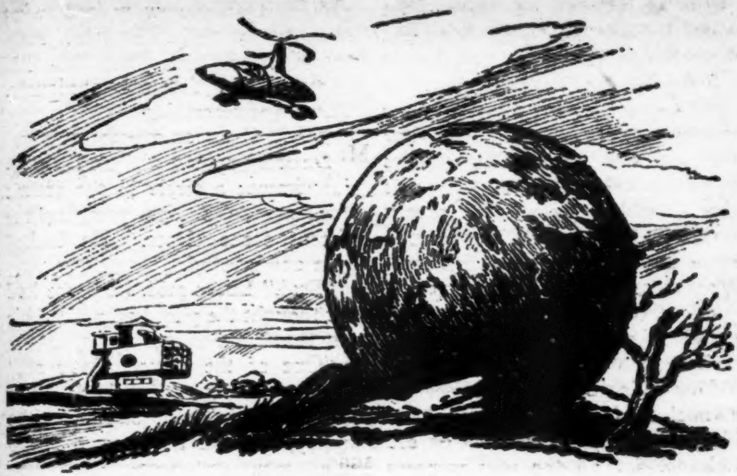
Locke shook his head. "Mr. Cameron. Is this man to come along?"

The director glanced back, his face puzzled. "He . . . what? Oh, yes. He's to come with us."

"If you say so." Locke looked sourer than ever, but fell in behind DuBrose.

They went past Communications, and the secretary raised his eyebrows at Sally. She made a hopeless gesture. DuBrose took a long breath. It was up to him now. And he was very much afraid of what they might see in that sanatorium.

The dropper took them to a lower level, and now Locke took the lead, herding the others toward an express crosstown Way. DuBrose



settled back on the seat and tried to relax. He watched the ivory-pale, luminous ceiling of the tube slide past overhead, but that smooth synthetic substance made no barrier to his thoughts. They probed beyond, into the roaring clamor of the Spaces where the machines thundered in the heartbeat of the city, peopling those abysses with a clamorous life of their own. No men worked there. The men who ran the machines sat comfortably in the air-conditioned, soundproofed buildings, with the scanning windows giving them the illusion of a life that wasn't underground. Unless you opened one of the valves, you could spend your life in Low Chicago and never realize that it was more than a mile beneath the earth's surface.

Claustrophobia had been one of the first problems. And plenty of neuroses had ripened into full psychoses before certain necessities had been met and certain problems solved. Neuroses that only the warmen had, because the majority of the civilian population didn't have to live underground. Decentralization had saved them from being bomb targets.

"This station," Locke said over his shoulder. DuBrose touched a button under the chair's arm. The three seats slid off the fast belt into a spur track, slowed down and stopped. Locke silently led the way into a pneumocar that stood waiting. He closed the door and reached for the controls. DuBrose grabbed a strap just as a lean finger stabbed at top acceleration.

His stomach massaged his spine. By the time his sight came back, after the momentary blackout, he was automatically playing the old game every warman played—the hopeless task of trying to orient himself and guess the direction in which the car was plunging. It wasn't possible, of course. Only twenty men really knew where Low Chicago was located—top-rankers at GHQ. The labyrinth of tunnels that branched from the cavern ended in as many different spots, some a mile away, some five hundred miles. And, because of the winding course, all the cars took exactly fifteen minutes to reach their destinations.

Low Chicago might be under the cornfields of Indiana, under Lake Huron, or under the ruins of old Chicago, for all the war workers knew. They simply went to one of the Gates known to them, were identified, and got into a pneumocar. Then, a quarter of an hour later, they were in Low Chicago. As simple as that. Every underground city had the same system, a preventative measure against drill-bombs. There were other precautions, too, but DuBrose wasn't a technician. He had been told it was impossible to get a triangulated radio fix on any war city—and accepted the fact. War, these days, was more of a chess game than a series of battles.

The car stopped; they walked through a short tube into the cabin of a helicopter. The vanes shrieked. The plane rose and maneuvered jerkily in a quarter turn. Through a window DuBrose could see the feathery branches of trees slipping downward. Then, as they rose higher, an arid stretch of hills was visible. DuBrose wondered what state they were in. Illinois? Indiana? Ohio?

He leaned forward anxiously. There was something—

"Eh?" Cameron glanced at him.

DuBrose spun a dial on the window-frame; a circle in the plastic thickened to a lens, bringing the distant scene closer. He looked once and relaxed.

"Dud," Locke said. DuBrose had not thought the pilot had noticed his movement.

"One of the domes, that's all," Cameron said, settling back. But DuBrose didn't stop staring at the silvery, tattered thing on the hillside.

It was a hemisphere, a hundred feet in diameter, and there were seventy-four of them scattered over America, all exactly alike. DuBrose could not remember when they had been perfectly opaque, mirror-silvery shells; he had been eight years old when they had appeared out of nowhere, all at once, cryptic with their secret that had never been solved. No one had been able to get into them, and nothing tangible had ever come out. Seventy-four shining hemispheres had come from somewhere, causing a near-panic. Another secret weapon of the enemy.

An area thirty miles around each shell had been cleared of civilians, while experts tried to solve the problem, expecting at any moment that the things would blow up. A year later they were still working.

Five years later they continued their tests—more sporadically.

Then the unbroken smoothness of the domes began to be marred. Striae made networks across the polished substance that wasn't matter. And the webs broadened, as though quicksilver were flaking from the back of a mirror, until the shells were tattered and split. It was possible to see inside then, but there was nothing inside—simply bare ground.

Nevertheless no one had been able to get into a dome. The force, whatever it was, remained constant; something like solid energy made an impassable barrier to solids.

Long since the public, continuing to think the enigmas a secret weapon that had failed, had named them Duds. The title stuck.

"Dud," Locke said, and turned on the auxiliary rockets. The landscape vanished in a blur.

DuBrose glanced at Cameron, wondering how soon the alkaloid surrogate would wear off. Pix weren't infallible. Sometimes—

But sight of the director's calm, relaxed face reassured him. It would be all right. It had to be.

Cameron was looking at the altitude gauge on the instrument panel. It was smiling at him.

II.

Dr. Lomar Brann, the neuropsychiatrist in charge of the sanatorium, was a compact, dapper, alert man with a waxed moustache and sleek black hair. He had a way of clipping his words that made him seem brusquer than he was. Now his eyes narrowed a little at sight of Cameron, but if he noticed the director's euphoria, he didn't show it.

"Hello, Cameron," he said, tossing charts on his desk. "I've been expecting to see you. How are you, DuBrose?"

Cameron smiled. "I'm under sealed orders, Brann. I don't know what I'm here for."

"Well . . . *I* know. I've had my own orders. You're to examine Case M-204."

The director jerked his thumb toward a visor screen on the wall. It showed a patient fidgeting nervously in his chair, while the oval inset screen just above held a close-up of the man's face. The audio was saying softly:

"They were always after me and the birds whose ferds couldn't stop and the noises trees freeze sees words always go like words—"

Brann turned the visor off. The wire-tape spool stopped unreeling; the recording faded and died into silence. "That's not the one," Brann said. "He's—"

"Dementia praecox, eh?"

"Yes, d. p. Disoriented, rhymes words—usual case history. I'll have no trouble curing him, though. Two months and he'll be on a farm topside."

That was the usual procedure after psycho-patients had undergone treatment in the underground hospital-city. They were put into the care of specially selected sponsors, where the cure could progress under more normal conditions. DuBrose had made a survey of the system as part of his psych field work.

Brann looked slightly puzzled. He had noticed the euphoria, then—but he wouldn't comment on it while DuBrose and Locke were there. He said, "I suppose we may as well look at M-204."

Cameron said, "His identity is secret?"

"Not my field. The Secretary of War will tell you later, don't worry about that. I'm just supposed to show you the patient. Mr. Locke, if you'll wait here—"

The guide nodded and settled himself more comfortably into a chair. Brann ushered Cameron and DuBrose through a door into a cool, softly lighted corridor. "He's my own private case. Nobody else sees him, except the two nurses. Constant attendance, of course."

"Violent?"

"No," Brann said. "It—isn't my field, really. The man—" He unlocked a door. "Through here. The man has hallucinations. A perfectly ordinary case, except for one thing."

Cameron grunted. "What's the diagnosis?"

"Well, tentatively—paranoia. He's assumed another identity. A rather . . . ah . . . exalted one."

"Christ?"

"No. We've plenty of patients who've taken on *that* identity, Cameron. M-204 believes he's Mohammed.

"Symptoms?"

"Passive. We force-feed him. You see, he's Mohammed after Mohammed's death."

"Old stuff," Cameron said. "Retreat to the womb—escape mechanism?"

"What's his position?" DuBrose asked, and Brann nodded approvingly.

"Good point. Not the foetal posture at all. He stays on his back, legs extended, hands crossed on his chest. He doesn't talk. He keeps his eyes shut." The neuropsychiatrist unlocked another door. "He's in this private suite. Nurse!"

A husky red-headed male nurse appeared as they stepped into a well-furnished, comfortable hospital room. A serving table stood in one corner; equipment for force-feeding was in its glass case, and there was a transparent-paneled plastic door in the further wall. The nurse nodded toward that door.

"The patient's being examined, sir."

Brann said, "A technician of some sort, Cameron. Not medical. I think his field's physics."

DuBrose was staring at a six-foot stepladder which seemed incongruously out of place in the neat, sterile chamber. The plastic door opened. A worried-looking man popped out, blinked at them through thick-lensed spectacles, and said, "I'll need this." He seized the ladder and disappeared.

"All right," Brann said. "Let's take a look."

The adjoining room was a solitary, but comfortable enough. A bed had been pushed out from the wall. A few pieces of technical equipment were on the floor, and the physicist was pushing the stepladder toward the bed.

M-204 lay flat on his back, hands folded on his chest, his eyes closed and his lined face perfectly blank and expressionless. But he wasn't lying on the bed. He was floating in the air five feet above it.

Automatically DuBrose looked for wires, though he knew there was no reason for hocus-pocus here. There were no wires. Nor was M-204 supported by glass or transparent plastic. He—floated.

"Well?" Brann said.

Cameron said, "Mohammed's coffin . . . suspended halfway between heaven and earth. How's it done, Brann?"

The doctor touched his mustache. "That's out of my field. We've taken the usual tests. C.B.C., urinalysis, cardiograms, basal—and we had a time doing it," he added, grimacing. "We had to strap the patient down to run our X-rays. He—floats!"

The physicist, perched precariously on the stepladder, was doing cryptic things with wires and gauges. He made a low, baffled noise. DuBrose watched the technician move a gadget slowly back and forth.

"This is crazy," he said.

"He's been here since yesterday morning," Brann said. "M-204 was found in his laboratory suspended in midair. He was irrational then, but he could talk. He explained he was Mohammed. After half an hour, he became completely passive."

"How did you get him here?" DuBrose asked.

The doctor fingered his mustache. "The same way we'd get a balloon here. We can maneuver him around. When we let go, he bobs up again. That's all."

Cameron stared at M-204. "Man of about forty . . . notice his fingernails?"

"I did," Brann said grimly. "Up to a week ago, they were well-kept."

"What was he doing this last week?"

"Working on something I'm not allowed to know about. Secret military information."

"So . . . he discovered a means of neutralizing gravity . . . and the shock of it . . . no. Because he'd be expecting just such results. If he'd been working on—say—a bombsight, and suddenly found himself floating up off the floor—" Cameron scowled. "But how can a man—"

"He can't," the physicist said from the stepladder. "He just can't do it. Even theoretical antigravity requires machines. My instruments must be bollixed up."

Cameron said, "How?"

The technician held up a gauge. "It's registering—see the needle? Now watch." He touched a metal-tipped wire to M-204's temple. The needle flipped back to zero. Then it shot wildly to the limit, wavered there, and subsided back to the zero mark again.

The technician descended. "Fine. My instruments don't work when I use them on that guy. They work all right elsewhere. But—I don't know. Maybe he's suffered some chemical or physical change. Though even then I should be able to make a qualitative analysis. It's crazy." Muttering, he repacked his equipment.

Cameron said, "It's theoretically possible for an object to float in air, though, isn't it?"

"You mean an object heavier than air. Sure. Helium will inflate a dirigible. Magnetism will hold up a chunk of iron. Theoretically it's quite possible for this man to float. That isn't the problem at all. Theoretically practically anything's possible. But there's got to be a logical reason. How can I find a reason when my instruments don't work?"

He made a despairing gesture, his wrinkled, gnomish face twisted in angry lines. "They want me to work blind, anyway. I've got to find out what this man was working on. That's where I'll find the explanation. Not here!"

Brann looked at Cameron. "Any questions?"

"No. Not yet, anyhow."

"Then let's go back to my office."

Locke was still waiting when they came in. He stood up impatiently.

"Ready, Mr. Cameron?"

"What next?"

"The secretary of War."

DuBrose groaned inaudibly.

III.

Within the next four hours—

A rocket engineer traced a circuit for the ninety-fourth time, sat back, and started to laugh. His laughter changed to a shrill, incessant screaming. The infirmary doctor finally shot apomorphine into the man's arm, before painting the raw throat. But when the engineer woke up he instantly began screaming again. As long as he made noises he was safe.

The circuit the engineer had been tracing was part of a gadget the enemy had dropped in quantity. Four of these gadgets exploded, killing seven technicians and wrecking valuable equipment. The ones that exploded were the Duds.

A physicist rose from the papers on his desk, went quietly to his workroom, and rigged up an effective high-voltage circuit. Then he electrocuted himself.

Robert Cameron, a portfolio under his arm, returned to Low Chicago and hurried to his office. The doorknob felt normal as he touched it. He went to his desk and opened the portfolio, spreading out the photostats and charts. He looked at the clock and saw the hands standing at one minute to seven. He compared it with his wrist watch.

Cameron waited for the seven musical strokes. They did not come. Again he glanced up at the white, numbered dial.

A mouth had opened there. It said, "Seven o'clock."

Seth Pell was Cameron's aide and alter ego. He was thirty-four, had white hair, and a round, fresh face that might have belonged to a teenager. Next to the director, Pell was probably the most competent man in the psychometric field—probably better in neuropathology, though without Cameron's broader knowledge of technology.

He walked into his office with a reassuring smile for DuBrose. "What'll you have?" he asked. "A sedative or a stiff drink?"

DuBrose couldn't match that airy lightness. There was a dull pounding behind his eyes.

"Seth. If you hadn't shown up—"

"I know. The world would have come to an end."

"Did the chief tell you what happened?"

"I didn't let him," Pell said. "I persuaded him to take a dose of Deep Sleep and he settled for ten minutes' worth. Then I got psychonamical. He's thoroughly hypnotized by now."

DuBrose breathed deeply. Pell perched on the edge of his desk and began paring his fingernails.

"O.K.," he said. "I've taken your word that it's necessary to get the chief under hypnosis fast. You're the only guy I'd trust enough to do that blind. I don't usually buy a pig in a poke. So?"

DuBrose felt weak. If he couldn't convince Seth now—but he was certain he could. The danger was too real, too evident for misunderstandings.

He said, "The Secretary of War—Kalender, you know—came this morning. The chief was busy, so I asked Kalender if I could do anything. He was plenty upset or he wouldn't have talked to me, even though he knows I've got the chief's confidence. He talked a little—not much, but enough for me to smell trouble. There's a problem. But—here's the catch. Everyone who's tried to solve it has gone insane."

"Yeah," Pell said without looking up.

"I don't want the chief to go insane," DuBrose said flatly. "I managed to slip a Pix pill into his whiskey before Kalender got hold of him. It was all I could do. But it'll help if you think artificial amnesia is necessary."

"Mnemonic work is up my alley," Pell said. "However—let's go see." He slid off the desk.

DuBrose followed him. "Kalender wouldn't let me in when he talked to the chief a while ago. So I don't know what they discussed."

"We'll find out. Come on."

Cameron lay relaxed on the couch in his office, the Deep Sleep plate still pulled out from the wall. His breathing was slow and regular. Pell picked up the unconscious man's wrist, while DuBrose brought chairs.

"All right. Now for the mumbo-jumbo. Cameron—can you hear me?"

It didn't take long. Pell was an expert psychonamics man, and he had Cameron's complete confidence, which helped. Soon Pell leaned back, crossing his legs.

"What's all this about Secretary Kalender, Bob?"

"He—"

"You know who I am?"

"Seth. Yes. He . . . told me—"

"What?"

Cameron didn't open his eyes. "You have to walk in the other direction to meet the Red Queen," he said. 'The White Knight is sliding down the poker.'

Pell was startled. DuBrose whispered, "He balances very badly."

That drew a response. Cameron murmured, "Something on that order. Is that you, Seth?"

"Sure," Pell said. "What about Kalender?"

"It's big trouble. We've got hold of a formula that doesn't seem to mean anything. It means a lot to the enemy, though. I still don't know how the equation fell into our hands. Espionage, probably. But it's important, and it's got to be solved, and it doesn't make sense."

"What does it deal with?"

"There are general and specific applications. Like the law of gravitation. There are constants involved, but . . . the sum of the parts doesn't seem to equal the whole. The equation *in toto* doesn't make sense. *In partis* it does. You can suspend the laws of logic, apparently. And the enemy is doing just that. They've dropped some bombs that can pierce force-shells. Which is impossible. When the bombs were examined, they didn't make sense either. But they tied up with that equation. The technicians are trying to solve that equation. But—they go crazy."

"Why?"

Cameron didn't answer directly. "M-204 was one of the first to work on the thing. He didn't solve it. He learned how to neutralize gravity, and went insane. Or the other way around. We've got to find a solution, Seth. I've been glancing over the equation . . . it's on my desk—"

Pell jerked his thumb; DuBrose rose and collected the papers, shuffling them into a compact stack. He gave them to Pell, who didn't look at them.

"We've got to find the answer," Cameron said. "Or else. The enemy will have unlimited power—"

"Have they solved the equation?"

"I doubt it. Partially, that's all. But they'll do it, unless we forestall them."

Pell was grinning, but DuBrose noticed diamonds of perspiration on the man's forehead below the silvery hair.

"We've got to solve it," Cameron said.

Pell stood up and beckoned DuBrose into his office. "Nice going," he said. "You did the smart thing."

"That takes a load off my mind. I wasn't sure—"

Pell said, "If a man's wife breaks her leg, he's half nuts till the doctor arrives. Then it's all right—he can shift the responsibility to more competent hands and relax. It isn't his job any more. But the doctor is equipped to handle a broken leg. The responsibility won't bother him."

"And in this case—we're not equipped?"

"I haven't looked at the equation," Pell said, tossing the sheets on his desk, "and I'm not sure I'm going to. I can just imagine what that fool Kalender told the chief. Fate of the nation rests in your hands. You're responsible for finding somebody to solve the problem. If you don't, you'll have lost the war for us. So. That shovels the responsibility right into the chief's lap—and he's got to solve the equation or go nuts. That the way you figured it?"

"More or less." DuBrose chewed his lip. "That case—M-204—he learned how important the thing was, and took refuge in insanity. Paranoia in his case, you said. He must have solved part of it, and it couldn't have made much sense. The equation *is* the weapon, not its by-products."

"If nobody worked on it, the enemy might solve it first. Even as it is, they can penetrate force-fields. What they might do if they got all the answers . . . ! No, we've got to keep working, but not the way Kalender has in mind. That idiot thinks you can cure leprosy with an order of the day."

DuBrose said slowly, "I figured we could erase the chief's memories of what's happened today. Implant pseudo-memories, harmless ones. And then present the problem to him after we've yanked out the poison fangs."

"Smart boy," Pell nodded. "The trick will be to keep the chief from realizing his responsibility. That'll be our job. I'm not sure just yet—" He glanced at his watch. "The first thing is to treat the chief. Wait for me."

He went out. DuBrose moved to the desk and shuffled the photostats and papers. Some of the symbols made sense; others didn't. Still, he noticed that pi had been assigned an arbitrary and erroneous value. Was that a basic?

Better not look. He tried one of the windows, but the landscape blurred before his eyes. Could an equation cause insanity?

Of course. The equation was simply the concrete symbol of the abstract problem. The old test of the white rat and the anxiety neurosis. Slam the doors shut when the rat doesn't expect it, so he can't get at the food. After a while the rat simply huddles down and shivers. Nervous breakdown.

To have this interminable, unending war over might be a blessing. But to lose it—!

Not to the enemy. Generations of indoctrination had made that unthinkable. Men were conditioned to war now. They didn't even hate the enemy. But they knew, very thoroughly, that they must not lose.

Bombs dropped on both sides. The robots waged their pitched battles. But the real warriors were the technicians who moved the chessmen and created new gambits. There were no more diplomats; there was no need for them. There was no communication with the enemy, except the sudden messages that roared out of the sky.

Messages were received—and sent. But they were not convincing enough. Aerial torpedoes could not harm the protected nerve-centers of either country.

The annunciator said, "Mr. Pell. A courier from the Secretary of War."

"Mr. Pell's busy," DuBrose said. "Have him wait."

"He says it's an emergency."

"Have him wait!"

There was a brief silence. Then—

"Mr. DuBrose, he won't. He wanted to see the director, but Mr. Pell ordered all messages relayed through his office, so—"

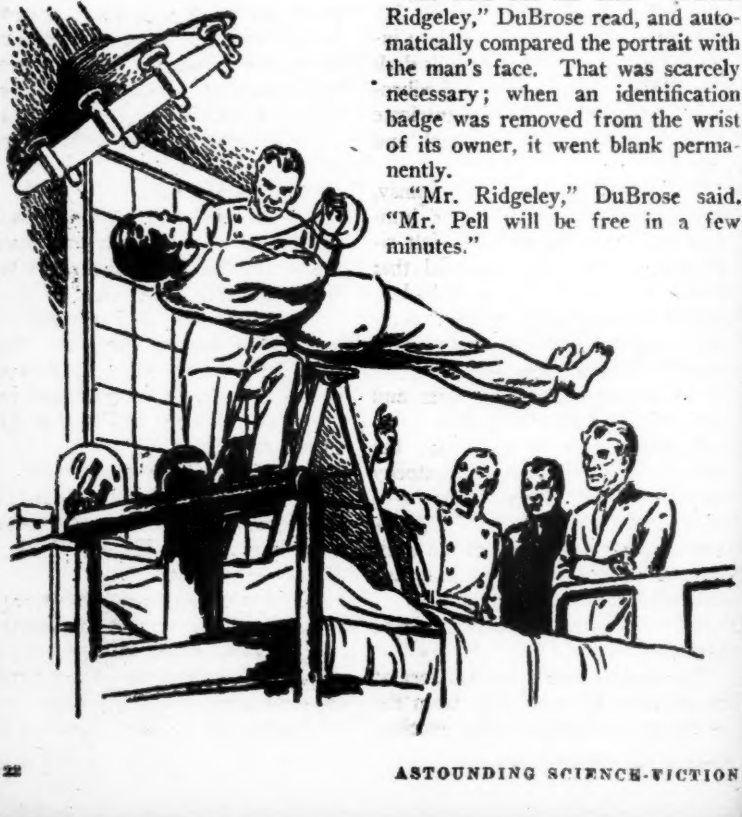
"Send him in here," DuBrose said, and turned to the door as it opened.

The courier's brown-and-black uniform meant something; he was Secret Service. Men who wore the arrow insignia on their lapels were rare—and got their authority directly from GHQ. This man—

He was sturdily built, neckless, and with cropped bronze hair that glistened metallically in the cool light. But it was his eyes that held DuBrose. They held an odd look of restrained excitement, of joyous, wild exultation held rigidly in leash. The thin mouth was well under control. Only the black eyes were betraying.

He held out his disk. "Daniel Ridgeley," DuBrose read, and automatically compared the portrait with the man's face. That was scarcely necessary; when an identification badge was removed from the wrist of its owner, it went blank permanently.

"Mr. Ridgeley," DuBrose said. "Mr. Pell will be free in a few minutes."



Ridgeley's deep, slow voice held impatience. "Priority. Where is he?"

"I told you—"

The courier glanced at the door and took a step toward it. DuBrose barred his way. The strange, febrile excitement flamed behind the jet eyes.

"You can't go in there."

"Get out of my way. I have my orders."

DuBrose didn't move. The courier made a quick, apparently casual motion, and the secretary went staggering across the room. He didn't try to intercept Ridgeley; instead, he plunged toward Pell's desk and jerked open a drawer. A vibropistol was there, a lovely, intricate mechanism of sturdy crystal and shining metal.

DuBrose's hands felt clumsy, like mush-filled gloves, as he fumbled with the weapon. He felt ridiculously melodramatic; odd that in this war of attrition men had so little experience with physical combat. As far as he knew, this vibropistol had never been used.

He leveled it at the courier and said, "Take it easy!"

Ridgeley was facing him, the heavy shoulders bent, the stocky body crouched a little. That inexplicable devil of half-mocking delight burned behind the man's eyes, and with it was something like fast, icy calculation.

Then Ridgeley walked toward DuBrose.

He shifted catlike on his feet as he moved, and four feet from the secretary he stopped, quite motionless, his expression blank and intent. DuBrose felt sweat trickle coldly down his ribs.

Ridgeley said, "I've my orders."

"You can wait."

"No," the courier said. "I can't." And his whole body seemed to draw inward, like a huge cat gathering itself together. Though he was holding no weapon, he seemed more formidable than the armed DuBrose.

A lock clicked. The door to Pell's consultation room opened. On the threshhold stood a young man of about twenty, thin, pale and stooped in his wrinkled tunic and shorts. His eyes were closed. He was making a hacking, unpleasant noise in his throat, moving his lips jerkily as the sound rose and fell without cessation.

"K-k-k-k-k-k-kuk!"

He came forward. There was a chair in his way. He walked around it and avoided the desk, though his eyes were still tightly shut.

"K-k-k-k-kuk! Kuk-kkkkk!"

DuBrose moved too late. The vibropistol was deftly jerked from his grip. Ridgeley stepped back, his gaze flashing from DuBrose to the young man.

"Who's that?" he asked.

DuBrose said, "I don't know. I didn't know Pell had a patient—he must be a patient. But—"

"K-k-k-k-k-kuk!"

The boy's excitement was rising. He stopped, his whole body beginning to shake uncontrollably. That unpleasant sound rose to a harsh thick croaking.

"Kuk-k-k-k-k-kuk!"

"Well," Ridgeley said, "I've got to see the director. Is he in there?"

"He's busy," Seth Pell said. "You can talk to me. I'm second in charge."

The aide was standing by Cameron's door, smiling casually, ignoring the vibropistol in Ridgeley's hand. "Ben," he said, "will you take that patient back in his room? Give him a light shot if necessary. But a sedative should be enough."

DuBrose gulped, nodded, and took the boy's arm.

"K-k-k-kkkk!"

He led the jerking, shaking figure back into the examining office and swiftly got him on the table. A heated blanket, a pink pill, and the boy lay quiet, his shivering subsiding. DuBrose adjusted an alarm to ring if the patient got off the table and hurriedly returned to Pell's office.

The vibropistol lay on the desk. Ridgeley was arguing quietly. Pell hadn't moved.

"—my orders. I'm to deliver this case to the director. The Secretary of War told me that himself."

Pell said, "Ben, get Kalender on my visor, will you?" He nodded at Ridgeley, turned, and disappeared through the door behind him. By the time he came back, Kalender's heavy, hard face was on the screen.

The courier took a cylindrical metal case from his pocket. Robert Cameron, behind Pell, ignored it. The director went straight to the televisor and faced Kalendar.

"Oh—Cameron," the Secretary of War said. "Did you get that—"

Cameron said, "Listen. All messages and contacts are to be filtered through my aide, Seth Pell, until further notice. I want nothing delivered directly to me. Hereafter all calls to me must reach Pell first. Including GHQ and priority calls."

"What?" Kalender was taken aback. His strong jaw thrust forward. "Yes, yes," he said impatiently. "But I want to talk to you. My courier—"

"I haven't talked to him. He must deal with Pell."

Kalender snapped; "This is official business, Cameron—and priority! I don't want this handled by subordinates! I want—"

"Mr. Secretary," Cameron said quietly. "Listen to me. I'm not under GHQ. I'm running the Department of Psychometrics my way, and I don't permit my authority here to be questioned. If I wish to use Seth Pell as a filter, that is my affair. Until the government gives you more authority than you've got now, you'll allow me to handle my own business in my own way. That's all!"

He snapped the switch on the apoplectic Secretary of War and turned to his office. The courier stepped forward.

"Mr. Cameron—"

Cameron gave him a cold stare. "Did you hear what I told Mr. Kalender?"

Ridgeley said, "I've got my orders." He held out the metal case.

The director hesitated. Then he took it. "All right," he said. "You've done your job."

He handed the case to Pell and walked back into his office. The door closed softly.

Pell tapped the metal cylinder against his knuckles. He waited, watching Ridgeley.

"Well," the courier said, "I gave it to the director, anyhow." His eyes met DuBrose's briefly; then he saluted casually and went out.

Pell tossed the cylinder on the desk. "Nice going," he said. "Lucky the chief backed me up."

DuBrose touched the vibropistol with an exploratory finger. "I . . did the chief—"

"It's all right," Pell smiled. "We've time to work on the problem now. I gave our director the works—a complete quick mnemonic treatment. He doesn't remember anything that's happened today. I gave him some phony memories instead. Now we can let him have the problem without the responsibility—if we can figure out how to do that."

"You didn't rouse his suspicions?"

"The chief trusts me. Completely. I told him I wanted to be a filter for a while, and not to ask me why. He'll wonder, of course, but he can't guess the right answer. I've wiped out the dangerous memories."

"Completely?"

"Completely."

Cameron opened the window and watched the red darkness pulse and shift. A vague memory troubled him, but not too much. It was simply part of this thing that had come on him—the thing he had to fight out by himself. There must be a reason. There had to be. If he submitted himself to psychiatric examination, he'd . . . no. That wasn't the way. Visual and auditory—and tactile—hallucinations . . .

That dim memory came back. It was impossible to place its sequence in the day's events—a fairly dull and ordinary day. He hadn't budged from the office, there had been few callers—but this memory, like the doorknob and the clock and the smiling altitude gauge, probed with soft insistence into his mind.

A man floating in midair.

Hallucination.

IV.

"The chief's gone home," DuBrose said.

"Fair enough." Pell spread papers on his desk.

"Shouldn't one of us—"

The aide glanced sharply at DuBrose. "Relax, Ben," he said lightly. "Hypertension's setting in. The chief won't receive any calls. He'll have 'em routed to me. Mm-m—" He hesitated. "Look. Take these cards and alphabetize 'em while we talk. Or else have some Deep Sleep."

DuBrose accepted the cards, shuffling them automatically into sequence. "Sorry," he said, "this thing's got me a bit, I guess."

Pell's white hair glistened as he bent forward over charts. "Why should it?"

"I don't know. Empathy—"

"Orbs," Pell said. "I could be as jittery as you if I wanted to. But I've studied history and literature. And architecture, and a lot of things. Just to balance this psycho work. There's a lot more perfection in a Doric column than in you."

"Yeah. But I can build a Doric column."

"You can also build a backhouse. That's the trouble. You're as likely to do one as the other." He chuckled. "'I do not like the human race . . . I do not like its silly face.'"

"What's that?"

"A guy named Nash. You never heard of him. The thing is, I'm part misogynist, Ben. If somebody wants me to like him, he's got to prove he's worth liking. Few people do."

"Oh, philosophy," DuBrose growled, dropping a card. "What's this? Palate deformation developing at twenty with—"

"Group of cases I've been investigating," Pell said. "Academic value only, I'm afraid. No, it isn't philosophy; I just can't get excited over anything that threatens people in the aggregate. Humans aren't selective. They lost selectivity when they gave up instinct for intelligence. And so far they haven't learned to discipline their creative powers. A bird will build a nest that's a beautiful piece of engineering."

"Dead end."

"I'm not infatuated with birds either," Pell remarked. "They're too reptilian for my taste. But people—in fifty thousand years or three times that time, they may have learned the art of selectivity. They'll be worth knowing—all of them. At present genus homo is struggling up through the mire, and I'm fastidious."

"Proving what?" DuBrose asked, irritated.

"Proving my egotism," Pell laughed. "And explaining why I'm not hot and bothered over this particular danger." But, DuBrose thought, it didn't explain why Pell seemed so unconcerned about the danger threatening the director. Cameron was Pell's closest friend; there was a warm affection between the two men. It was something else in the aide's mind, a latent strength, a steel discipline, that enabled him to keep his balance.

DuBrose didn't know Pell. He admired and trusted him, but had never tried to encroach on a certain deep restraint that Pell kept buried, under his casual flippancy. Often he wondered. There were rumors, scandalous even in these amoral days, about Seth Pell's private life—

"Uh-huh," the aide said. "Quite a problem. Everybody who's worked on this equation is either showing signs of strain or going nuts. *Unless*—here's a factor—unless they could delegate the responsibility. The enemy's been dropping bombs that penetrate force-fields. A few have exploded. Most haven't. Apparently the hookup's impossible. There's one gadget that can't possibly work on the same circuit with another gadget. Twelve men in various fields have already gone insane. Two with suicidal tendencies have committed suicide. Somebody named Pastor—physicist—says he'll have the equation solved within a few days. No way of checking that at the moment. And so on, and so on. We'll have to make some personal interviews. Our job is to gather the data and correlate it. Including the fact that part of the equation can nullify gravity."

DuBrose had finished alphabetizing the cards. He flipped them idly.

"How can we present the problem to the chief?"

"Well—he mustn't realize its importance. I think the best way is to bury it. Handle the whole affair casually. But *not* give him the equation. He's too good a general scientist to be trusted with *that*. If he tried to solve it himself . . . and it seems to have some sort of fascination. No, we've got to gather all the information that's pertinent, make sure it's innocuous, and hand it over to the chief. That means leg work."

"Can we handle it that way? Isn't there a danger of emasculating the vital factors so much that—"

Pell said, "We've got to find out exactly why technicians go crazy when they try to solve the equation. And the chief has to think of somebody who *can* solve it."

He stood up. "That's enough for now. Let's wind up the day." He tossed the papers into a drawer and made adjustments. A dome of icy white light sprang into existence around the desk.

DuBrose said, "Force-fields may not be so safe any more, if the enemy can drop bombs through them."

"I set the incendiary, too," Pell said. "But who'd want to steal that equation? The enemy's got it already." He went into the examination room, DuBrose following. The boy still lay asleep on the padded table, his eyes closed, his breathing even.

"Who is he?" DuBrose asked.

"Name's Billy Van Ness. Typical case—one of that group on the cards you were juggling. Delayed puberty, age twenty-two now, sudden physical and mental changes started two months ago. Only constant is the fact that all the cases were born within a radius of two miles from a Dud."

"Radiation affecting the genes of the parents?" DuBrose was picturing the silvery, tattered dome on the arid hillside.

"Could be."

"Enemy?"

"A weapon that didn't work, then. Only about forty cases in all. It's odd; they were all perfectly normal up to two months ago—except for delayed maturation. Then they matured and some curious physiological changes set in. Deformation of the palate . . . but it's the mental metamorphoses which are more interesting. They never open their eyes—a familiar enough symptom. Recognize it?"

"Naturally."

"But—"

"Wait a minute," DuBrose said. That boy could see. He walked around a chair that was in his way."

"A little trick they have," Pell smiled. "ESP for all I know. They never bump into anything when they walk about—which is seldom—but they never go in a straight line. A twisting, erratic pattern always, as though they're walking around things that aren't there as well as things that are."

"Balance distortion?"

"No, they're steady. They just walk as though they're threading a path through a roomful of eggs. What excited this boy?"

DuBrose made a few guesses.

"It's unusual," Pell said. "They seldom rouse from their passivity unless they're near a Dud. That seems to excite them. They make that funny noise. Unpleasant, isn't it?"

"Any prognosis yet, Seth?"

Pell shook his head. "I'm going to try mnemonic probing. If nothing else works. I may be able to throw this boy's mind back to his more normal past. Well, let's have those cards." He tossed them on a table and rang for an attendant. "Billy can stay in the infirmary tonight—private room. Get your cloak, Ben. We're going out."

DuBrose said, "Any equipment—"

Pell chuckled. "Not for this therapeutic work, brother. We're going to extrovert for a few hours—but good. You've got a bad case of hypertension. Deep Sleep won't cure it. If I told you to go out and eat Pix, you'd do it, but you'd still feel subconscious anxiety. This way you'll be able to relax, because I'm your superior, and the responsibility's mine."

"But . . . look, Seth—"

"You're going through the mill tonight," Pell said. "Tomorrow we'll go crazy together."

Only a helicopter could have landed on this outcrop of the Rockies. A drill-press had run wild across the sky; the rarefied atmosphere made even low-magnitude stars brilliant. The path of the Milky Way splashed its cataract toward the Wyoming horizon eastward, and the frigid wind made DuBrose's jaw muscles tighten. Then the force-field lifted again, blotting out the sky in a curdled dome of silently crackling light.

The house under the field looked like a chalet, but those steeply sloping roofs were functional in a region where the snowfall was measured in yards. It wasn't snowing now; bare, brittle ground crunched under DuBrose's feet. He went on with Pell toward the porch and presently was standing in a huge room that might have been furnished by a color-blind man. A dozen periods of furniture were represented; a Louis XIV sofa sat under a Gobelin tapestry, and the tapering sleekness of Brancusi's "Bird in Space" perched incongruously on a Victorian marble-topped pedestal. Oriental rugs clashed violently with bearskins on the floor and trophy heads on the wall. One whole side of the room was a segmented projection screen. Beneath it was a Fairyland box and control panel, one of the most complicated DuBrose had ever seen.

"Wonder if Pastor furnished this place himself?" DuBrose muttered.

"Sure," a voice behind him said.

"Just the way I wanted it. It scares people sometimes. Make your landing all right? The thermals are tricky around here."

"We managed," Pell said. DuBrose was staring at the gnomish little man, with his wrinkled nutcracker face. And Dr. Emil Pastor stared back, blinking through heavy lenses.

"Oh, it's you," he said. "I never did catch your name."

"DuBrose. Ben DuBrose. Dr. Pastor and I met at the sanatorium, Seth—he was examining that patient, M-204. The one who floated."

"Floated," Pastor said, blowing out his cheeks expressively. "You don't know half of it. I found out what part of the equation he was working on. Lovely stuff, pure symbolic logic, except for one thing. Two things, rather. If you neutralize gravity completely, centrifugal force will shoot you out in space at a tangent. Right? But M-204 just floated. According to his figures—based on that equation—the trick's theoretically possible. All you have to do is utilize the arbitrary values the equation assigns to two symbols—orbital velocity of the earth and the power necessary to lift a body out of the earth's gravitational influence."

"*Arbitrary* values?" DuBrose asked.

"Sure. They're really constants. 66,600 m.p.h. for the first, 6,000,000 kilogram-meters for the second. The equation says it only takes 10 kilometers to get away from gravity, and the first constant can be ignored. It's zero. The earth doesn't revolve at all."

"What?" Pell said.

Pastor made a significant gesture. "I know. M-204 is insane. But his insanity is based on something peculiar. He thinks he can float because the earth doesn't revolve. And—he floats. Nevertheless it moves!"

The aide said, "What about those 10 kilometers? Energy—"

Pastor nodded. "That, too. Energy has to be expended constantly to maintain a balance like that—antigravity. Unless you have enough orbital velocity to keep moving, like the moon. But M-204 doesn't expend energy, does he? Or does he?"

"Your instruments went haywire, you said," DuBrose suggested.

"Which is significant," the little physicist agreed. "Perhaps from where M-204's sitting, the earth *doesn't* revolve. But my instruments aren't able to register that; they were built on an earth that does revolve." He laughed shortly. "I'm so immersed in this business that I've forgotten my manners. Take off your cloaks. Drink? Deep Sleep?"

DuBrose demagnetized his throat-fastener and tossed his cloak toward a rack that caught it deftly. "Thanks, no. We won't keep you long. You're—"

"I'd have solved the equation before this," Pastor said, "if the big shots hadn't moved me out of Low Manhattan. They found out some bombs were exploding and figured I might wreck the cave. So I came up here. If I do detonate, the force-field will limit the casualties."

Pell said, "Those bombs could penetrate force-fields, couldn't they?"

"They could indeed. Come in here." Pastor herded them into a cluttered laboratory, much of it singularly unorthodox and jerry-built. He searched a messy table for a photostat blueprint. "Here's a diagram of the bomb's mechanism. Know anything about electronics?"

"Very little," Pell said, while DuBrose merely shook his head.

"Oh. Well. Anyhow, see this tricky business? It'll work on one type of circuit, but not on another. This other gadget will work on the other type of circuit only. But they're both functioning perfectly on the same circuit. We've tried reversing them, we've tried standing on our heads and looking cross-eyed, but the fact remains. Two mutually incompatible elements are functioning beautifully together. It can't be. But it is."

Pell stared at the diagram. Pastor said, "What do you think of that?"

"I think it's tough on the engineers who had to figure out how and why the bombs got through force-fields."

The physicist said, "The equation, as far as I can tell yet, is founded on something like variable logic. It's full of mutually incompatible basics."

"Two and two make five?" Du Brose said.

"Two and whee make diddle plus," Pastor corrected. "It can't be expressed in basic English. A semantics expert would give up in disgust. It says here"—he indicated a paper—"that a free-falling body drops at the rate of five hundred feet a second. Later on in the equation that body is dropping at nine inches a second. And *that's* a basic!"

"Does it make any sense at all to you?" Pell asked.

"There are glimmerings," Pastor admitted. He went to a basin and began washing his hands. "I'm going to knock off for a bit. I could use some Deep Sleep—but we can talk first. Though I don't know what I can tell you yet."

Pell hesitated. "These variables—our science takes certain constants as foundation-stones, truisms on which that science is built."

"What is truth?" Pastor asked, rinsing his hands. "Sometimes I wonder. Anyhow—"

They went back into the big, cluttered room. The physicist wandered over to the Fairyland control panel, idly touching the studs. "I don't know," he said. "I'm trying to keep an open mind. It certainly isn't logical that bombs could penetrate force-fields, especially bombs that can't possibly work."

DuBrose said, "Could this have any connection with the Duds? They're supposed to be enemy weapons that failed. And they're unbreakable force-fields."

Pastor didn't turn. "Unbreakable, yes. Force-fields—I'm not so sure. I was on a couple of commis-

sions delegated to study the Duds, and I had a theory or two nobody wanted to accept. Of course twenty-two years ago my mind was more elastic—" He grinned. "If you go through the files on that business, you'll find a man named Bruno said he'd detected hard radiations from one of the Duds."

Pell leaned forward on the couch. "Matter of fact, I did run across that reference. But it wasn't too detailed."

"There was no proof," Pastor said. "The radiations lasted for about an hour, Bruno's instrument was the only one set up at that time, and you can't chart a graph from one point. The radiations formed a pattern of sorts, though. Bruno thought it might be an attempt at communication."

"Yes, I know," Pell said. "The report stopped there."

"The rest was guesswork. Who'd use hard radiations to communicate?"

DuBrose was remembering Billy Van Ness, with his closed eyes and his rasping *"K-k-k-kuk!"* noise. Warping of the basic genes, latent until delayed maturity, emerging as a so-far inexplicable psychopathic condition—

He said, "There's no radiation from the Duds now?"

"We can't detect any."

Then why did cases like Billy Van Ness rouse from their stupor when they were near one of the tattered silver domes? Scarcely recognition, even through ESP. Such a memory would have to be acquired, not hereditary.

Pastor said, "Oh, I suppose there's some sort of energy, or the Duds wouldn't still be impermeable. But we can't detect it. I doubt if the Duds can be connected with—this equation."

"As long as you solve it—" Pell said. "There is an occupational hazard, you know."

"Insanity. Want to test my knee-jerks?"

"As a matter of fact, I would," the aide said. "Got any objection?"

"None at all."

"Ben."

This was routine. DuBrose made notes and watched as Pell questioned the physicist, apparently irrelevant questions that all made sense, in the aggregate pattern. Finally they had finished, and Pastor sat back grinning.

"Normal enough. You're an asocial type anyhow."

"But not antisocial. I've a wife and two kids"—he pointed to tri-di cube portrait of transparent plastic—"and I adjust all right, with one thing and another."

Pell said, "I've never seen such a complicated Fairyland set. Use it much?"

"Often." Pastor went to the controls. "I got away from the company patterns years ago. I create my own systems and paradoxes—"

Flashing bands and streaks of color flamed across the screen. They almost made sense.

The physicist said, "In this sequence, I've assigned human emotions to colors. I make up the plot as I go along."

For a while they watched the coruscating screen. Then Pell stood up.

"We'll leave you to Deep Sleep, Dr. Pastor. Will you call us if anything breaks?"

"Sure." Pastor switched off the Fairyland. "But I'll have that equation solved within a few days. I'm certain of it."

"How certain?" DuBrose asked later in the helicopter.

"I don't think he's whistling in the dark. But he's juggling plenty inside that head of his. A queer fish, Ben."

"No sense of esthetic values."

"I wonder. His own, maybe. I want a detailed psych report on Pastor from what we've observed tonight. Wax it and let me have it for additions as soon as you can, will you? If Pastor solves the equation, everything's fine. But if he doesn't—"

"Do you think he's a psychopathic type?"

"Everybody can go crazy, in one way or another. He's not potentially suicidal or homicidal. Possibly schizophrenic—I don't know. We'll head back to Low Chicago now. If we can integrate enough dope by morning, we can put it on the chief's desk."

DuBrose pulled out a smoke-tube from the instrument panel and inhaled deeply. His mouth was tight. Pell chuckled.

"Getting you, Ben?"

"A little." More than that, really, when the disphragm is stiff and unsteady, and invisible bugs are crawling along the skin. DuBrose moved uneasily in the cushioned seat, while cogs slipped together without meshing in his thoughts.

"Cui bono?" Pell said. "It's not our responsibility, remember."

"Isn't it?"

"We can't solve the equation. We can't find the man who can— unless Pastor's the one. Only the chief is qualified to integrate the final factors."

"Yeah," DuBrose said, while the little bugs crept down his arms.

V.

Ripples broadened in the mirror. Concentric circles fled out from the locus, distorting Cameron's face. He moved aside, watching the ripples gradually subside.

Then he moved again, directly before the mirror. When the image of his face hit the glass, the ripples started once more. He waited. They lessened and stopped.

Each time he blinked, however, minor circles began, one for each eye, spreading out over the smooth surface.

The angle of incidence is equal to—

Cameron looked at the tired face under its thatch of gray hair. He tried to keep his eyelids immobile.

Blink.

Ripple.

Quite impossible.

He turned away. He looked around the room. It was no longer a room to be taken for granted. Not the room he had known for years, in this house he had known for years. If the mirror betrayed him, so might the contoured, yielding floor. So might the billiard table. So might the glowing ceiling, and—

He turned sharply and mounted the stairs, without touching the escalator control. He wanted solidity under his feet, not the soft sliding motion that reminded him the earth was no longer quite as firm as usual.

His whole body jolted violently. Only rigid control kept him from—

It had been nothing much. He had mounted a top step that wasn't there. That could happen.

Had he *seen* that intangible top step? He tried to remember and couldn't.

This wasn't the first time. When he was off guard, when he had forgotten, then that top step that wasn't there would be there. Not tangibly. Not even visually, perhaps.

The visor was humming. Cameron reached it before Nela did. She shrugged and turned away, her sleek dark head suddenly terrible. Cameron stood with his hand on the switch, watching Nela walk back to her seat. He was wondering what he would do if a face, Nela's face, should suddenly appear on the back of her head.

Or not Nela's face.

He waited. He was afraid to stop looking until she had turned around. But it was Nela, with her cool, amused dark eyes and her tilted nose. He was glad she had never undergone rejuvenation. Old, wise eyes were wrong, somehow, in too young a face. Attractive as Nela was, her face was mature, and very comforting now.

"Well?' she said, lifting her eyebrows. "Are you taking it?"

"Eh? Oh—" Cameron pressed the switch. The blunt, dark face of Daniel Ridgeley, the courier, checkered in, wrist raised to show the identification disk.

"Priority. Message from the Secretary of War—"

Cameron said coldly, "Seth Pell will receive it."

Something exultant and gleeful flickered in those jet eyes. "The Secretary insists, sir—"

Cameron snapped the switch. The screen blanked. After a moment the humming started again. Cameron turned off the set.

He put an elbow on the mantle and looked at nothing. His elbow slowly began to sink through the wood. He jerked away, glancing hastily at Nela. She was patting pillows into shape on the couch behind her.

She hadn't noticed. No one noticed, ever. You couldn't expect them to notice.

"You're nervous," Nela said. "Come and lie down here."

"You're the only one who's seen it," Cameron said. "Nela, I—"

"What?"

"Well—nothing. I think I'm overworked a bit. I'll furlough pretty soon."

He walked to the one-way windows. He could see out, into the moonlight speckling the tree-shadowed hillside, but no light filtered through those panes to attract enemy aircraft. If any aircraft *could* get past the coast barrages.

"Come and lie down."

If he did, the couch might melt away beneath him. This room was too familiar. It was charged with latent horror. The familiar things were the ones that had betrayed him.

Better to be among unfamiliar things. If they behaved strangely, he might not notice it so easily. Was that fallacious reasoning? Too specious? At least it was worth acting on.

He came behind the couch and kissed the top of Nela's head. "I'm going out for a bit. Don't wait up."

"The boys called today. You haven't seen the recording."

"It'll keep. How do they like the school?"

"They kicked, as usual. But they like it. They're growing, darling. In those school uniforms—" Nela laughed softly. "Remember?"

He remembered. Twins, fourteen years ago. They'd both been surprised. But they'd made plans, long-range plans—

He kissed Nela again and went out quickly. The copter took him to a Gate. A pneumocar shot him to Low Chicago, but not to his office. That, too, would have been familiar.

He found a valve and went out into the Spaces, automatically taking a light-tube from its rack, but slipping the cylinder into his pocket. Behind him the giant artery of the Way was a great Midgard Serpent coiling into the darkness.

Low thunders muttered around him. Under his feet the ground was gritty and hard. He went on slowly, staring around at the titans that served the city.

The pumps sighed and coughed;

the heart of Low Chicago beat through the crimson gloom. Near him a mechanism of some sort rose and was lost in the shadow above. Out of blackness a piston, fifty feet in diameter, drove at him, hesitated, and shot back again. Forward it came, and back, forward and back, forward—

Lightning crawled across the vaulted ceiling that sheathed Low Chicago.

Br-r-rooom—*thlock!*

That was the piston.

Whssssss . . .

Compressed air.

Whroooom . . . *whroooom.*

Pump.

His feet scuffed through dusty slag. Something was moving down there. He crouched, staring at the things that slipped swiftly and noiselessly through the cinders, red and black—

Chessmen.

His hand went through them.

Subjective. *The chessmen were walking about two by two.* A projection of his thoughts, preoccupied with a land beyond the looking glass, where the expected did not always happen. They were not there . . .

He did not look down again to make sure. Cameron swung around and walked hurriedly toward the nearest Way, not hearing the low thunder of the Spaces re-echoing all around him.

A valve opened; he stepped through and found a seat on one of the belts. His hand lay open on the padded arm. Suddenly something was thrust against his palm; instinctively his fingers tightened.

A metal cylinder.

He looked back. Already his chair was ahead of the seat on the slower belt that had briefly adjoined his. Daniel Ridgeley, the courier, was sitting there, jet eyes burning with excitement.

Cameron raised his arm and threw the cylinder straight at Ridgeley.

The courier lunged aside and caught it. His mouth opened in a soundless laugh.

The director's finger touched a stud; the chair slid aside. Instantly Cameron was out of it, a reasonless cold panic filling him. Now he wanted familiar things, not the dim, strange vastness of the Spaces. And here was the infirmary annex to his own department, a refuge against—

Against what?

He looked over his shoulder, but Ridgeley had vanished. The panic had not gone, though. Cameron stepped into a lift and got off without noticing the floor. He stood looking into a dim, quiet room where a dozen beds made pale oblongs.

He came forward a few steps and paused, absorbing the peace that brimmed the room.

A nurse's voice said, "All right?"

"All right," Cameron said. "It's the director."

"Yes, Mr. Cameron—"

The lift sighed. A low humming began; that meant unauthorized intrusion. The nurse's televised voice began to speak and broke off. Cameron swung around and began to back up.

He felt a door panel behind him. He groped for the knob, and it bent like putty beneath his fingers. Someone was coming along the hall outside, someone who was making staccato, harsh noises in his throat.

But at the other end of the room the lift's barrier slid aside, and the stocky, hunched form of the courier stood there, shapeless in silhouette.

Behind Cameron, in the hall, someone was going, *"Kuk-k-k-k-k-k—"*

Ridgeley came on. Cameron could see the cylinder in his hand.

The director let go of the useless doorknob. "You're not allowed in here," he said thinly. "Get out."

"I've my orders. Priority."

"See Seth Pell."

"The Secretary of War told me to deliver this to you personally."

With part of his mind Cameron realized how irrational this nightmare was. All he had to do was take the message and give it, unopened, to Pell. As simple as that. But somehow it didn't seem quite so simple; with that bulky, squat figure plodding relentlessly forward.

"K-k-k-k-k-kuk!"

Ridgeley put the cylinder into Cameron's hand.

The door behind the director opened, letting a shaft of pale light in. Cameron turned his head, blinking. Pell's white hair gleamed as he stood staring, his hand tight on the shoulder of a young man wearing an infirmary bedsuit. The boy was shaking from head to foot, his eyes were closed, and the rasping, harsh noise was coming from his throat.

DuBrose was there, too, his young face strained. He pushed past Cameron into the dormitory.

Pell said, "Easy, Ben. Chief—"

"You'd better take this," Cameron said, holding out the cylinder. "Kalender's courier—"

The patient stopped shaking. The rattling clatter died in his throat. Without inflection, in a rapid, staccato voice, he said.

"Everyone is too short, flat people, but this new one . . . I saw him before . . . he reaches in the right direction, long, long, longer by far than anyone else here . . . not as long as the shining things but he is more complete in his duration—"

The boy stopped. DuBrose, facing Ridgeley, caught a new expression on the man's face—something like wild, inexplicable delight.

"Sorry if I caused any disturbance," the courier said smoothly. "But my job's done. I'll go now."

Nobody stopped him.

An hour later Cameron was in Deep Sleep in his office, and DuBrose and Pell were working over Billy Van Ness. The boy was in third-stage hypnosis, and fragmentary words were beginning to emerge from the jumble of noises. But it took a long time before any coherent pattern became evident.

DuBrose spun the semantic integrator dial on the dictagraph and watched words form on a lighted screen. His lips moved as he read. He could hear Pell's soft, unhurried breathing behind him.

"It isn't ESP, then," Pell said. "It's ETP. Extra-temporal perception. That explains something that's puzzled me. The patterns cases like Van Ness follow when they walk. Certain symptoms of disorientation. They're just avoiding chairs that aren't there at the moment, but either were or will be. They reach for objects that were moved a week ago. They're disoriented in time—because they can sense duration."

"It's crazy," DuBrose said.

Pell watched the screen. "See how this sounds. Some race far away in time made an expedition. I don't know why. They must have been pretty unthinkably inhuman. Fifty million years in the future—or a hundred million. Maybe they faced extinction and took refuge in time instead of in space. They came here, twenty-two years ago, in the Duds. They didn't survive. While they did, for an hour, they—talked?—in their particular way. Not with sound waves. Not with vibrations. With hard radiations. Or perhaps they always emitted those radiations."

DuBrose looked at the hypnotized boy and swallowed dryly. Pell's cold, steady voice went on.

"Hard radiations. Genes getting knocked around—mutation. But a very queer kind of mutation. The only kind possible. It was a sort of biological meeting of two utterly unlike species. Mental. Genus homo and genus— X!"

They were perhaps the ultimate adaptation of life on earth. Their race had never been human; they had sprung from other seeds in their own unthinkably long ago. And they could move through time, in their own way. Not easily, for only under certain specialized, nearly unique conditions, could they exist at all.

Seventy-four temporal protective domes sprang into existence in the world of genus homo. From within those shells, genus X looked at a planet fantastically alien to them, as a human might regard the boiling gneiss raging across the seething crust of a molten earth.

And the hard radiations came out from the domes for an hour, radiations that were an integral part of the basic matrix of genus X. Human gene plasm responded. And was altered.

Before genus X passed, it had bequeathed to a few unborn specimens of genus homo certain latent abilities, wild talents not to be perceptible until the delayed maturation. And even then the powers of genus X would be all but useless to a merely human race.

The legatees could sense duration. But, by the time they were able to do that, they were hopelessly insane.

Pell said, "Some sort of energy must maintain what's left of the Duds. These mutants sense that. Or else they see—"

"What about Ridgeley?"

"I've checked the records. This is actually the first time any of these cases has ever roused from his lethargy except when near a Dud. Remember what this boy said when he saw . . . sensed . . . . Ridgeley?"

"It's integrated with the other stuff," DuBrose said. "There are several possible conclusions." He nodded toward the screen.

"Yeah. To somebody who can see duration, a baby must look plenty flat. No, I'm wrong. That would depend on the baby's longevity. If he grew up to be a hundred, he wouldn't seem so flat. But Billy said *everyone* was too short except Ridgeley. Ridgeley reaches in the right direction, longer than anyone else who was in the infirmary then—but not as long as the shining things.'

"The Duds. Wait a minute, Seth. If Billy here can sense duration, that might just mean that Ridgeley's going to live to a ripe old age."

Pell grunted. "Do you realize from how far in the future the Duds must have come? You can't compare the heights of ants when you use Everest as the measuring stick. If Ridgeley's duration is noticeably long to Billy's perception, he must reach plenty far along temporal lines."

"You're jumping at conclusions. There's not enough data—"

"You heard me question this boy. You heard the answers. Look how the integrator figures 'em!" Pell jerked his thumb toward the screen. "What about that list? I asked our patient what he—senses—in this room, and—"

The list was complete and inaccurate. It included present furnishings, equipment that hadn't been here for years, a diatherm that was scheduled to arrive next week, a centrifuge that had been on order for a month, and a great deal of material that wasn't expected at all, including some gadgets that probably weren't invented yet.

"*Now* doesn't mean much to Billy Van Ness," Pell said. "He's told us what he senses in this room in the past, present and future. Look at the word association conclusions. It all points to duration, and Ridgeley's tied up with it. I asked those questions with a purpose, Ben."

DuBrose moistened his lips. "Well, then—what?"

"My guess is that Ridgeley may have come from the future. Not from the incredibly distant future of the Duds, but from one closer to us."

"Seth, for Pete's sake! There's nothing to prove—"

"No proof at all. I know. And the only proof I may ever be able to get will probably be empirical. But it's the only answer that fits all the terms."

"You could pluck an answer out of the air for any problem," DuBrose complained, "if you ignore probabilities. You could say Ridgeley's a goblin who's found Aladdin's lamp!"

"I'm not saying anything definitely. This is a theoretical solution. Nothing more. Billy Van Ness has ETP. His duration comparisons indicate that Ridgeley doesn't compare with radium half-time but about equals iron. If the boy were a metallurgist I could learn more. I don't know what grade of iron he has in mind. But, roughly, the life expectancy of ordinary iron equals Ridgeley's duration, as Billy's ETP sees it."

"How long does iron last?"

"Find out. Come in my office, will you?"

There Pell put in a televisor call, a request for information on Daniel Ridgeley. "Now we'll wait and see. Sit down, Ben. What do you think?"

DuBrose dropped on cushions. "I still think you're jumping at conclusions. There might be other explanations. Why jump at the wildest possibility?"

"Yet you didn't cavil at the idea that the Duds might come from the future."

"That's different," DuBrose said illogically. "They don't *do* anything. What's Ridgeley trying to do? Upset the apple cart? Is he following Kalender's orders?"

"The Secretary of War is a brass hat, but he's no traitor. Ridgeley could be—probably is—acting on his own initiative. He may be in enemy pay. All along, Ben, I've been puzzled by one point: how the Falangists could have worked out this equation. *They're* not from the future. Their technology isn't much more advanced than ours, if at all. We live on this side of the world; the Falangists live on the other; but we're contemporaries. They're neither supermen nor are they from a super future. They're people like us. But Ridgeley—well, I think he's from the future, and he's butting into a fight that doesn't concern him. Or maybe it does, somehow. I don't know." Pell grimaced. "Well, I'm hungry. Let's order up some chow. We've been running around all night, and it's 3 a. m." He spoke into the mike, after switching off the force-field that guarded his desk.

"As for the report we're going to hand in to the chief," he said, fingering a fresh bundle of papers and spools before him, "it's integrated and ready, I think. We've taken out the dangerous stuff. Quite a job."

"About Ridgeley, Seth—"

"One thing at a time. I believe Ridgeley ties in with this equation business. He's been trying to give dangerous information directly to the chief. Well, we'll guard against that from now on. This latest message from the Secretary of War—seven more technicians have gone insane. Not Pastor; he's still working away up in his hideaway in the Rockies. But the danger is clearer now. The equation *must* be solved before the enemy solves it."

"Every technician in the country may go crazy," DuBrose said.

"Only top-flight men can work on a thing like this. The others aren't qualified. But those men are the ones who keep the war from being lost. They're the ones who think up offensives and defensives fast. If our best technicians are insane—and the list is growing—we're caught flat footed if the enemy launches an assault. There's one thing in our favor. Those insane technicians can be cured."

DuBrose thought it over. "Uh . . . yeah, I get that angle. They took refuge in insanity because they couldn't solve the equation, and the responsibility was too much for them. Show them the solution to the equation, and they'll snap out of it. Right?"

"Near enough. None of these case histories"—he tapped the pile on the desk—"indicate noncurable pathological states. Once we—" He stopped, looking past DuBrose.

"Hello, Ridgeley," he said.

DuBrose found himself on his feet, swinging to face the courier. Ridgeley was standing against the closed door, his eyes blazing, his face impassive as ever. In a lifted hand he held something so bright and glittering that DuBrose could not see it clearly.

"It's too easy," Ridgeley said.

"And you prefer it the hard way, is that it? I don't think you'll find it so easy."

"No?"

"How did you check up on us? Some sort of scanning ray?"

"Something of the sort," Ridgeley admitted. The thing in his hand trembled slightly; dazzling rays momentarily blinded DuBrose.

Pell said, "So we're right. You're from the future."

"Yes."

DuBrose snarled, "Why don't you go back there?"

For the first time he saw expression on those blunt features—something very much like fear. But Ridgeley only said, "No, I like it here. I'd rather no one knew as much about me as you two know. So—"

DuBrose glanced toward Pell, waiting for a signal. But the aide hadn't even risen from his seat. He smiled at the courier and said, "You turned off your scanner too soon. I've put in a routine check query on the visor. Querying you, Ridgeley. If we're found dead, or disappear, somebody will start wondering why the last time I used the visor, I asked about you."

"You wouldn't be found," Ridgeley said, but his voice wasn't quite as certain. He hesitated.

Tension grew in the room. Suddenly that burning, joyous excitement leaped again behind the courier's eyes.

"All right," he said. "We'll do it the hard way." He fumbled behind him, opened the door, and slipped out. DuBrose sprang forward, but Pell's quiet voice halted him.

"Hold it, Ben. No heroics. You haven't even got a gun."

DuBrose made an impatient noise. "Well, let's do something! Can't we have that . . . that guy picked up? Or—"

"I'll think about it," Pell chuckled. "Take it easy. You're flying off the handle. Here." He tossed a blue plastic key on the desk. "Why not knock off for a few hours?"

"I . . . , what is it?" DuBrose picked up the key and examined it.

Pell said, "Not many people have those, Ben. They open the door to supercharged hedonism. Show that key at Blue Heaven in Low Manhattan, and you'll get the most thorough dose of extroversion you can imagine. Useful when hypertension creeps up. Try their Creepies—it's a catharsis. Go on, get out of here. That's an order. You need something like—a blue key."

DuBrose said, "What about you? If Ridgeley comes back—"

"He won't. Go away. I'll expect you back in the morning, bright-eyed and ready for anything. *Outside!*"

DuBrose went away.

VI.

Across the curve of the world dawn came, rose and gray, the laggard sun behind. The cool light brightened on a quiet land. Tiny hamlets speckled the continent, and only a few flaming streaks that might have been meteors gave any hint that the peace was deceptive. Even across the gray scars of the cities, New York and Detroit and San Francisco, the reclaiming green crept out from the wildernesses that had been the city parks.

Helicopters with their glider-trains troubled still air. The rising sun glittered here and there on a few silvery, tattered shells, the monuments of genus X. Warmen began to drift toward the pneumocar terminals.

Before dawn—

Three more technicians had gone insane, two of them irreplaceable key men in electronics.

Mid-morning. Pell came into DuBrose's office, smiling and cheerful.

"Use that key?"

"Uh . . . no," DuBrose said. "I was dead beat. I took Deep Sleep. Feel better now."

"Suit yourself," Pell said, shrugging. "I got that report on Ridgeley. He's a highly confidential and trustworthy Secret Service man. Not just a courier. He's been responsible for several fast deals but benefited our side. He's been on the job for seven years. Every once in a while he disappears. No reason given. Unorthodox, but—he's valuable."

"To whom?" DuBrose asked. "The enemy?"

Pell looked puzzled. "He's been valuable to us, Ben. That's what throws me. He dug up plans for some gadgets we found mighty useful. There's never been any question as to his loyalty."

"Do anything about it?"

"Not . . . yet," Pell said slowly. "Except to put a few papers in my safe, just in case. The chief has the combination. Remember that."

DuBrose turned the subject. "How is the chief?"

"Jumpy. Nervous. I don't know why. I handed him the stuff on the equation a couple of hours ago—along with allied problems I dug up, to keep him from smelling a rat. I've handled it as semitheoretical material. I couldn't tell him how urgent it was—if he knew that, he'd realize its significance. But I loaded the other items with key words he'll subconsciously shy away from—the wrong emotional indexes for his personality. He'll study the equation dope first."

"Won't he wonder about Ridgeley?"

"I blamed that on the brass hats.

I said Ridgeley was just trying to do his duty—deliver his message to the Director of Psychometrics. Dunno if the chief swallowed it, but I gave him something else to think about—a few hints he'll chew on. Just in case he starts wondering too much why I wanted to isolate him and act as filter. I fixed it. Pretty soon he'll decide the enemy are trying to kill him. Simple assassination attempt. Toxin probably. Let him figure it out. A personal menace like that won't worry him in the least."

"Oh. Well—I've got nothing new. Billy Van Ness is completely passive now. Force-feeding, as usual. And I took a call from Dr. Pastor, up in the Rockies. He says he'll have the equation solved before the day's over."

"Good. How did he look?"

"Not too well. I notified Wyoming Emergency to stand ready. Though there wasn't any definite symptom. He talked a little too fast—but nothing psychopathic. The responsibility didn't seem to bother him."

"Fair enough," Pell said. "Now come along. The chief wants to see me about the equation—"

"Already?"

"He's a fast worker."

Cameron sat behind his desk and watched it rain. He thought that if he could get through the door, the rain might stop; but he wasn't hav-

ing any. He'd tried it already. Wading through knee-deep invisible water wasn't a pleasant experience.

The slanting veils of rain made the walls gray and shadowy. He felt the drops tap softly on his bare head and against his face and on his hands. With tremendous effort he remained motionless. Within his skin he was twisting and writhing.

There was, he thought, a gauge in his head, and a needle that had risen dangerously close to the red mark. He couldn't stand much more of this. What was keeping Pell?

As the door opened the rain stopped. Cameron looked at the backs of his hands; they were quite dry. So was the surface of his desk, and the carpet.

His head pounded.

He was rather sorry Pell and DuBrose had come in. That meant he had to do something. As long as he remained perfectly motionless, trying not to think, he could not easily be betrayed. Rain might fall, but the objects he reached for wouldn't slide away or collapse into blobs as long as he refrained from reaching.

Cameron drew in a long breath.

His voice came out more steadily than he had expected.

"Ben?"

"I wanted him to hear this," Pell said. "Got an answer for me?"

Cameron said carefully, "I think so. You didn't give me all the necessary factors, but there may be a way. What's this for?"

"I'd rather not say just yet. It's semitheoretical anyhow." Pell sat down; DuBrose followed his example.

"I'd say it's completely theoretical. Look here. You've got an equation based on constants gone variable. You want to know its probable effect on various types of trained personalities—scientifically trained. And you stipulate that the solution of the equation is a high-powered survival factor—the individuals *must* solve it. Is that correct, Seth?"

Pell nodded and crossed his legs, his eyes half-closed. "Correct," he said casually. "What do you think?"

"You left out one point. If the technicians fail to solve the problem, they'll go insane, under the circumstances."

"Mm-m. That's obvious, chief."

Cameron looked at something on his desk, hesitated, and seemed to lose the thread. "So . . . uh, well, the sort of equation you presuppose implies the use of truth itself as a variable. Or rather several sets of truths—all logical and accurate. Under certain conditions, let's say, an apple falls to the ground; under other conditions, it flies upward. In the first case the familiar law of gravitation holds good. In the second, it doesn't; an arbitrary basic is substituted, but a true one."

"Can mutually contradictory truths coexist?" Pell asked.

"It isn't likely," Cameron said. "I'd say no. However, let's take it for granted that such an equation does exist—for the sake of the theory. The ordinary technician, trained to intricate work, has had a sound groundwork in basic physics; he takes some things for granted. Like the law of gravitation. Or—conduction of heat. If he dips both hands in boiling water and his right hand is burned while his left freezes, he won't be able to understand it. If enough things like that happen—" Cameron paused.

Pell said, "Yeah?"

"Oh . . . he'll find refuge in insanity. His imagination, his mind, won't be sufficiently elastic to embrace a whole new set of variable truths. It would be like going through the looking glass. Alice did it without trouble, but she was a child. An adult would have gone insane."

"Every type of adult mind?"

Cameron said thoughtfully, "Lewis Carroll could have solved this hypothetical equation of yours, Seth. Yes, I'm sure of it."

Pell nodded. "A thoroughly elastic mind, one that isn't bound too much by familiar values, the sort of guy who invents woolly dog stories. Is that it?"

"A man who makes up rules of his own. That's it, all right."

"I want to find some men like that and chart their psychology," Pell said. "Got any suggestions?"

"Offhand, no. The average scientifically trained mind is inelastic by definition; it's fan-shaped. It's imaginative at the wide part of the fan, but it's rigidly censored by the narrow part—the accepted basics. I'll see if I can think of a screening process for you, Seth."

"All right," Pell said, rising.

Back in DuBrose's office, the two looked at each other blankly. Pell chuckled.

"So far, so good, at least. Find a man like Lewis Carroll. Can you think of a candidate?"

"Not without a screening process. Are there any mathematicians today who write fairy tales?"

"Not a one. And there aren't any fairy tale writers who make math their avocation. Not that Alice is a fairy tale, Ben."

"What is it? Allegory?"

"Symbolic logic, beautifully worked out from arbitrarily assigned basics. Pure fantasy—the purest kind. Well, we'll have to try screenings. Maybe the chief will think of something. Meanwhile, screen technicians by avocation; use the big files downstairs. I'll try for psychological patterns that might fit."

"O.K.," DuBrose said.

Twenty minutes later he was at the dictagraph when the visor hummed. The wrinkled, gnomish face of Dr. Emil Pastor checkered in.

DuBrose pushed a button that would summon Pell as he jumped up. "Dr. Pastor. Glad you called. Anything new?"

The tousled head nodded. Something flickered in the blue background; it looked like a bird. Blue background? What—

"I have finished with it," Pastor said. "Understanding it showed me the unreality of all things."

"You've solved it, then?"

"Solved the . . . equation? Not

all of it, no. But enough. Enough to show me the way. I can solve the rest now, if I wish. Ah, Mr. Pell."

"Hello, doctor," Pell said, stepping into the scanner's range. "I asked Mr. DuBrose to call me when you vised. Thanks, Ben. Now have I missed anything?"

"Dr. Pastor says he can solve the equation," DuBrose said.

"But I won't," Pastor said, blinking.

Pell didn't show surprise. "Mind telling us why not?"

"Because nothing matters any more," Pastor explained. "I've found that out. It settled *my* problem. Everything is hollow, like a soap bubble. Maintained in existence simply by a certain coherence of will, the acceptance of the expected."

Insane.

DuBrose saw Pell's shoulders slump a little.

"I'd like to discuss that with you personally," he said. "May I fly in to your hideout? If you'll shut off the force-field when I—"

"Oh, it's gone," Pastor said mildly. "I stopped believing in it and it disappeared. My house is gone, too—most of it. I let the televisor stand and part of the wall, because I'd promised to call you. But now . . . I don't know. What would we have to talk about?"

"The equation?" Pell suggested. A shadow crossed Pastor's face.

"No, I don't want to discuss that."

DuBrose saw Pell's hand move. He said, "Excuse me," and slipped quickly out of the office. It took him three minutes to vise Wyoming Emergency and have an ambulance copter dispatched to the peak where Pastor was now.

DuBrose went back into his office, and moved up behind Pell. Pastor was still talking.

" . . . couldn't explain the theory to you very well. It deals with certain variables I'm sure you wouldn't accept. But they're surprisingly effective in practice. I simply used will power on my house and it was gone."

"And that's an integral part of the equation?"

"Oh, yes."

"I don't see—"

"Like this," Pastor said. His wrinkled face twisted into an agony of concentration. He lifted his hand and pointed. DuBrose felt a sudden tension knot along his spine.

"You don't exist," Pastor said to Pell.

Seth Pell vanished.

In his office Cameron was about to eat lunch. The laden tray was on the desk before him. He dipped the soup spoon into onion broth and lifted it toward his mouth.

The edges of the spoon thickened, curled, spread into cold metallic lips.

And kissed him.

TO BE CONCLUDED.

N Day

by PHILIP LATHAM

There have been many tales of the terror and riots that precede the end of the Earth, when some scientist accurately predicts its doom. But now let's see—would men react quite that way . . . . . ?

Illustrated by Kramer

Tuesday, 1949 January 18

Sunspot maximum and three days without a single spot!

This cycle is certainly developing in a peculiar way. From the last minimum about March, 1944, sunspot activity jumped to a Wolf Number of 252 in December, 1948, the highest index on record since that rather dubious maximum back in 1778. But this month spots have simply failed to appear, as completely as if someone inside the sun had pulled a switch.

Clarke's elaborate empirical analysis has failed utterly to predict. I am now more firmly convinced than ever that no combination of harmonics can ever represent the approximate eleven-year rise and fall in the number of sunspots. Instead I favor Halm's old idea that each cycle is a separate outburst in itself. The very fact that our star is a weak variable means it is to a certain degree unstable. Not unstable to the extent of a Cepheid variable but still—unstable. Indeed, Halm's hypothesis appeals to me more strongly now than when he announced it four cycles ago.

There I go measuring my life in sunspot cycles again! But four cycles *does* sound much less than forty-four years. Yet how little more I know about the sun than when I first came to Western Tech. In many ways the sun reminds me of a woman: just when you think you are beginning to understand her, invariably she will fool you. Enough of that. What business does an old bachelor have writing such things in his diary?

The driving clock on the coelostat was out of commission again today but I will have to repair it somehow. President Bixby refused my request for three hundred seventy-five dollars on the grounds that the budget was already over the limit. I notice, however, that others seem to have no trouble securing large allotments.

Until some spots show up I suppose I can best employ my time testing those new Eastman IV-K plates that arrived today.

Evening

When I wrote this morning that the sun invariably does the unexpected, I had no idea my words would be so soon fulfilled.

Spent an hour this afternoon taking test plates on the solar spectrum in the yellow and orange. Imagine my astonishment upon examining one of the plates with an eyepiece to see the D3 line of neutral helium. Of course, D3 often shows above active sunspots, but I believe this is the first case of its appearance over a calm undisturbed region. Smedley would probably know about this but I dread to ask him. I know he regards me as an old fossil, and this would only be further proof of my growing senility. How different was my own attitude when I was a young instructor!

The weather looked threatening at sunset but when I stepped out on the platform just now the sky was clear. The valley five thousand feet above was a carpet of lights from downtown Los Angeles to Santa Monica. Better drive down for a haircut and fresh pipe tobacco soon—my two-weeks supply is nearly gone. I really shouldn't stay on the mountain so long at a time. Too much solitude is as bad for the mind as too much inbreeding is bad for the race.

Besides, I absolutely must get started on the notes Marley left behind. Publication of such valuable material should not be so long delayed.

Wednesday, January 19

The long quiescent spell in solar activity is broken at last, and how it was broken!

An enormous spot is coming around the east limb, that should be an easy naked-eye object within a few days. Unable to get magnetic classification but feel sure from general appearance must be a gamma. Radio and television stations beware. They will be in for plenty of trouble soon.

After the two direct shots of the sun, I switched the beam over for a look through the polarizing monochromator, just in time to catch a splendid surge. Near the big spot the sun was swollen up like a boil. Suddenly a long arm emerged from the protuberance moving at a velocity I estimated at one hundred fifty miles per second. After reaching out to about sixty thousand miles the filament paused uncertainly. Then it was withdrawn, as suddenly as it emerged.

So often the sun conveys the feeling of life. At times it is like a sleeping monster, sluggish, dormant; at others, alive and tense, like a tiger crouched to spring.

Thursday, January 20

In addition to the spot-group that came around the limb yesterday, a fast-growing spot has broken out in heliographic latitude 42 N. This is the farthest I have ever seen a spot from the solar equator. Maunder at Greenwich speaks of "faint flecks" as high as latitude 72 but this is a large vigorous spot with a magnetic field strength of 2000 gauss.

If the face of the sun is a strange sight when viewed directly, it is as nothing compared to its appearance when analyzed by the spectroscope. At 18 hours GCT photographed a broad bright wing projecting from the violet side of the red hydrogen line, presumably due to a streamer of gas spurting from the solar surface with a speed of around four hundred miles per second.

Not so spectacular but much harder to believe, was the discovery of a faint bright line in the blue. Yesterday I expressed surprise at finding 5875, the yellow line of neutral helium, in the sun. Today I was positively shocked when I discovered that 4686 of ionized helium also showed faintly.

I wonder if I should send a wire to Harvard? But I hesitate to take such a step. Perhaps I should check with Mount Wilson first. Yes, I will see if they have observed anything unusual. I hate to consult with Smedley on anything. How I wish Marley were here. He was always so sympathetic and understanding.

Friday, January 21

Apparently I am the only astronomer who has gotten a look at the sun recently.

Talked with the Mount Wilson office in Pasadena this morning. They said there is six feet of snow on the mountain, with the power line out, and the road blocked by slides and boulders. The Atlantic coast reports storms all the way from Jacksonville to Montreal. And in Europe the tense political situation has paralyzed scientific research.

Saturday, January 22

After clouds put a stop to observations last Thursday, I drove down to the campus for a look at Marley's notes. I found the box in my office where it had come all the way from Dunedin, New Zealand.

What a great observer Marley was. And what a lucky observer! Three years in the southern hemisphere and three novae so far south he was the only one to get a complete photographic record. To think I had the same opportunity and turned it down. But somehow I was afraid to leave the old observatory here and venture into strange surroundings.

Marley was one of the most uncommunicative men I have ever known. Whenever he had anything to say he said it in his notebook. Taking notes got to be a habit with him, just as keeping a diary is with me. He kept his notes on special forms which he had printed for that purpose and later bound them in black leather.

Exploring the contents of the packing box was sad business. Here was the sum total of a man's life work—a dozen leatherbound volumes, some reprints of his published papers, a box of plates taken at the coudé focus of the 60-inch, a worn account book, a few old letters and pictures. I feel guilty going through a man's personal effects in this way, but that was Marley's last wish.

Those sunspots are wrecking our communication systems. Traders went wild the other morning when stock market quotations came in all garbled up. For a while U. S. Steel was selling at 269 and Johns-Manville Corporation at 2½.

Astronomy in Wall Street—it can happen!

Sunday, January 23

More clouds and more desk work.

Preparing Marley's notes for publication in the *Astrophysical Journal* has not been so dull as I supposed. It begins to look as if he observed far more than any of us ever suspected; more than anyone has ever observed before him. Apparently he got on the trail of one of the biggest problems in astrophysics—the spectrum of a nova *before* the outburst.

One of the essential characteristics of novae is that they all go through practically the same identical changes, but at quite different rates. That is, some novae run through their life history much faster than others. The changes themselves are so similar, however, that an expert can take one look at the spectrum of a nova and accurately predict its behavior in the future.

We have many long series of observations on novae *after* the outburst. The one section of their life history that is still blank is the pre-maximum stage. Since novae arise from stars that were originally faint and inconspicuous, it is only by accident that we know anything about them before the explosion occurred. But it seems reasonable to suppose that a star must give *some* indication of the approaching cataclysm in advance, so that disruption could be predicted long beforehand—if only these symptoms could be observed and recognized.

Somehow or other this was precisely what Marley had been able to do. Thus on March 7, 1948, writing of Nova Muscae, he says: "The spectral changes a star exhibits in the pre-maximum stage are so well-marked that I now have no hesitation in predicting not merely the day but the very hour of outburst. These changes are identical although proceeding at vastly different rates for various types of novae. For example, a 'flash' nova, such as N Puppis 1942, might pass through a series of changes in a week, that would be prolonged for months in the case of a 'slow' nova like N Pictoris 1925."

Surely an observer as astute as George Lambert Marley would never have committed himself to such a statement unless he had the necessary and sufficient proof to convince a dozen men.

After poring over his notes till midnight I stepped outside the office to check the weather. Fog was drifting in from the ocean but the sky was still clear in the northeast. At first I thought a forest fire had broken out behind the San Gabriel mountains, for the whole heavens in that direction were suffused with a dull crimson glow. Then I realized it was an aurora, the finest I had seen since 1917. It was the type classified by the International Geophysical Union as *diffuse luminous surfaces* (DS), which often follow intense displays of rays and curtains.

The red glow soon faded away, but long after it was gone the impression it created remained, leaving me uneasy and restless, so that sleep did not come till nearly dawn.

Monday, January 24

The clouds began to break about eleven o'clock this a. m., causing me to jump in the car and get back to the Observatory full speed ahead. I climbed to the top of the sun tower as fast as my bronchitis would let me, set the mirrors, and hastened down to the spectrograph, arriving badly winded.

My first glimpse of the sun was a revelation. The high latitude northern spot has grown until there surely has never been a spot like it before. The excoriated area resembles not so much a sunspot as a great open wound in the solar surface; a region where the white skin of the photosphere has been peeled aside revealing the dark flesh of the umbra beneath.

While I was focusing the image —for the seeing was pretty bad— suddenly a cluster of points within the spot-group began to blaze like diamonds, becoming so intensely brilliant that I was momentarily dazzled. For fully ten seconds I must have stood there dumbly before I appreciated the significance of the phenomenon. It was a repetition of the effect Carrington had witnessed way back in 1859—the only known case of a so-called solar "flare" becoming directly visible on the surface of the sun.

Like Carrington, at first I was too startled to behave rationally. What to do? Should I try to photograph the spectrum of the luminous points? But I hesitated fearing they might be gone before I could load a plate holder and make an exposure. Finally, goading myself into some kind of action, I grabbed an eyepiece and began examining the solar spectrum visually, checking on the appearance of the different lines as best I could by eye.

As I expected, the hydrogen lines were so bright over the flares that they actually sparkled. In fact, the whole Balmer series was lit up, from H alpha in the red to H epsilon in the violet. H beta glittered like Vega on a clear frosty night. Bright lines of ionized metals, chiefly iron and titanium, were also visible. Wholly unexpected were two strong bright lines gleaming in the green and red. Although unable to measure their positions closely I am convinced in my own mind of their identity. They are 5303 of Fe XIV and 6374 of Fe X—lines previously observed only in the corona and a few novae.

Upon beholding these lines I went nearly wild. I was now determined to get a photograph at all costs. Rushing into the darkroom I tore the wrapper off a fresh box of plates, loaded the plate holder, and was outside again in less than three minutes. But alas!—clouds were racing over the image of the sun blotting out the flares almost completely. Nevertheless, I clamped in the plate holder and pulled the slide, praying for five minutes of clear sky which was all the exposure time I needed. But instead of getting better the clouds grew thicker, and before I knew it rain was splattering down on top of the spectrograph, forcing me to close the dome in a hurry.

What an opportunity I missed! The second time in a century this effect has been seen and I failed to get a single permanent record. I hope Smedley never hears of this.

Wednesday, January 26

I have just telegraphed the Harvard College Observatory. Although fearful to release a message of such sensational import, I felt that the information in my possession should no longer be withheld.

After failing to get a photograph of the coronal lines, the weather looked so bad that I decided to drive down to the office and continue work on Marley's notes. After the statement I found on Sunday night, I felt sure he must have left a complete account of the pre-maximum stage behind. But he failed to mention the matter further, seeming to be more concerned with improving the transmission of his spectrograph than with stellar instability.

I went through one leather bound volume after another until the entire set was exhausted, and nothing remained but some letters and an old account book. The latter I had already passed by several times, as unlikely to contain anything more scientific than Marley's laundry bills or his losses at bridge. Yet it was in this very book that Marley had entrusted his most valuable data, on the old principle of "The Purloined Letter," that people seldom look in the obvious place. These data might easily have been discovered accidentally if kept in his regular notebooks, but it was highly improbable that anyone would give a second glance to a cheap account book.

The first page bore the caption, "Course of Events in Galactic Novae." Underneath he had written: "Once instability has definitely developed in a star the series of events as described herein is invariable, although proceeding at different rates. The rate of development, D, may be calculated for any particular date of outburst, N, by the formula, $\log N = \log Rh/c - 3 \log D$. On the next page Marley had given the values of the constants together with a table from which log D could be interpolated. The parameter, D, seemed to be a function of several variables the meaning of which was not clear. But there was no ambiguity about how to use D itself.

The rest of the pages were ruled into three columns each. The first was labeled DATE, and bore such entries as N—12, N—11, . . . N, N+1, et cetera. The second column contained the predicted appearance of the nova's spectrum, while the third evidently referred to how well the predictions agreed with observations. Obviously agreement was excellent in most cases, for generally there was simply a check mark, with perhaps some such comment as, "nebular lines exceptionally strong," or "4640 stage rather late," et cetera.

At the end of the series Marley had written the Greek letter capital Mu with a flourish. This was Marley's astronomical signature, analogous to Herschel's famous H, and Otto Struve's Omicron Sigma. I happened to know it also meant Marley was satisfied with this piece of work and that it was ready for publication—an unexpected bit of luck for me.

Turning through the leaves and marveling at the wealth of material at my fingertips, I began to be aware of something vaguely familiar about certain of the entries. They followed a pattern that I recognized without being able to identify. Thus near the beginning of the series there were such notations as, "First appearance of He I," or "Bright wings violet side of hydrogen lines," and "4686 of He II faintly visible." It was the remark on page 4 that finally penetrated. "These early stages cannot always be discerned with absolute assurance; indeed, from my observations on T Pyxidis and T Coronae Borealis, it appears that a star may exhibit all the foregoing symptoms of instability without necessarily exploding. *The first sure sign is the appearance of the green and red coronal lines. These constitute proof positive that the star will proceed to outburst as a flash nova.*" The italics are Marley's.

I'll admit that after reading this I was badly shaken. The inference was unmistakable. Something had gone wrong within the sun. Instability instead of manifesting itself by the usual harmless eleven-year rise and fall in sunspot activity, had been much more serious in the present cycle. Beginning as far back as 1945 or '46, some break or dislocation had occurred far below the surface. Insignificant at first, disruption had gradually spread, releasing stores of latent energy previously untapped within the atom. This latent energy had now built up until the first signs were becoming evident, the warning signals that disruption was close at hand.

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No wonder the sunspot cycle had developed in a peculiar way! No wonder mammoth spots were breaking out in high latitudes. No wonder high temperature lines of helium were beginning to blaze in the solar spectrum!

How long?

Marley had given a little formula from which the rate of development could be calculated. To find the day of outburst it was only necessary to substitute the appropriate value of log D from his table and solve for the corresponding value of N.

Dreading to know the answer, yet impelled by a fascination I could not resist, I went to work. Let's see, the coronal lines had appeared on day N—53, which in Marley's notation made log D equal to -8.7654. R was the radius of the sun in centimeters, h was Planck's constant, a c was the velocity of light.

I began taking the numbers out of a log table with trembling hands. So great was my agitation that I was compelled to repeat the calculation several times. Adding up the figures I could not suppress a cry of despair. Log N was 0.4774. Barely three days—seventy-two hours left. Next Saturday at the latest.

Frantically I went back through the notes, searching for some loophole, some hint that might invalidate the whole proceeding. Like a lunatic repeating the same act over and over again, I must have calculated the value of N a dozen times. I carried the figures out to a ridiculous number of decimals. Always the result was the same. Three days—seventy-two hours. Less than that now!

At daybreak I tossed the calculations into the wastebasket and brewed myself a pot of coffee in the electric percolator I keep at the office. While it was boiling I composed the following message to Harvard:

5875 HE I OBSERVED INTEGRATED LIGHT CENTER OF SUN JANUARY 18. 4686 HE II OBSERVED IN EMISSION JANUARY 20. CORONAL LINES 5303 AND 6374 SEEN OVER SPOT GROUP AT 57 WEST 42 NORTH JANUARY 24. SOLAR PHENOMENA CLOSELY FOLLOWING PATTERN DESCRIBED BY MARLEY UNPUBLISHED MATERIAL ON NOVA CIRCINAE 1947, NOVA MUSCAE 1947, NOVA ARAE 1948.

PHILIP LATHAM

After telephoning the message to Western Union I read it over again with considerable satisfaction. Certainly no one can accuse me of exaggeration or sensationalism. I have stated the facts and nothing more.

Evening, January 27.

Well, the cat is out of the bag.

This afternoon while measuring a plate of N Circinae taken at the Cassegrain spectrograph there came an authoritative knock at the door. Peering outside I discovered two young men, one of whom carried a camera and tripod. They introduced themselves as a reporter and photographer from the morning *Chronicle*. It seems that a flash had come in over the teletype about my wire to Harvard and they had been sent out to investigate. When I expressed astonishment that my wire had reached the press they had a ready explanation. Scientific news has become so important since the war that men are especially trained to handle events of this kind. Naturally they keep a close watch on the Harvard College Observatory, which acts as the clearing house for astronomical discoveries. The result was that as soon as my message was received it was immediately rewritten in popular terms and released over the wires of Science Associated.

I was reluctant to talk at first, but the young man was very persuasive, and before I knew it I was telling far more than I ever intended. I began cautiously enough, emphasizing the importance of Marley's brilliant work at Dunedin and minimizing my own efforts. I presume that reporters eventually grow extremely expert at drawing people out for it was certainly true in my case. After the reporter had filled several pages, the photographer got me to pose for several pictures, peering into the eyepiece of the measuring machine, examining a celestial globe as if I were an astrologer, et cetera. I felt perfectly ridiculous, but whenever I started to protest they brushed my objections aside, so that I found myself meekly submitting to whatever they wished. The session lasted for fully an hour, and when it was over I felt as exhausted as if I had given half a dozen lectures.

Then just as the men from the *Chronicle* were leaving a couple more arrived from the *Dispatch*. This time I really endeavored to refuse them admittance, objecting quite vehemently to this invasion of my privacy. But they were so insistent, claiming that since I had given the *Chronicle* a statement it would be unfair not to do the same for them, that at length I relented. Besides, they said, if they returned to the office empty-handed, they might lose their jobs. So to my intense chagrin I had to go through the whole performance again.

Since they left about an hour ago I have had time to think it all over and I feel terribly upset. The reclusive life of a professor of astronomy is surely a poor preparation for solving the harsh problems of human existence. Whenever I have to face men outside the university I feel so helpless, almost like a child.

I see so clearly that I should have politely but firmly refused them admittance right from the start. If I could only assert myself, take a firm stand and then stick to it. Now there is no telling where this may end. Worst of all, there is not the slightest excuse for me. Not the slightest excuse in the world.

I am thoroughly aware of the official attitude here toward sensational newspaper publicity for members of the faculty. A professor over in the Economics Department was recently compelled to resign, his whole career ruined, because of a story that he gave out to one of the picture magazines. Next year I will reach the age of retirement of sixty-seven, but had hoped to continue some investigations I had started at the Observatory, as well as picking up a little pocket money teaching Astronomy 1 in summer session. But, if the statements I just issued arouse adverse criticism, my petition for post-retirement work will almost certainly be denied.

Once I nearly screwed up sufficient courage to call the papers and forbid them to use the story. But I didn't know how to explain myself adequately over the phone, and besides it might result in making matters even worse. The more I turned the situation over in my mind the more deplorable it seemed. I would be held up to ridicule, might be compelled to resign. I had served the institution to the best of my ability for four decades, only to end my career in humiliation and disgrace.

Midnight

Sitting in the gathering dusk a few hours ago my heart filled with despair, an idea began filtering through my consciousness; an idea so simple and obvious that it had escaped me completely.

If the world were coming to an end, what difference could anything possibly make?

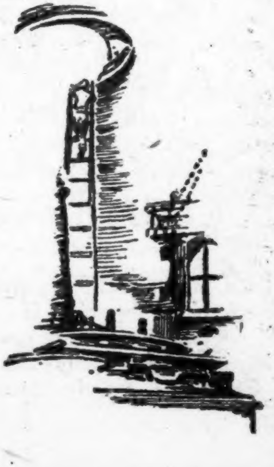
It required considerable time for my mind to grasp that elementary fact clearly and firmly. When it did the impact was terrific. For the first time I felt free. The sensation was glorious—like being born again.

Going back over the years it seemed to me I had always been afraid of something. I had always been too timid to assert myself, too fainthearted to assume my rightful position in the world. How often I had seen other men less capable move on ahead, become big research men or executives, while I was content to remain obscurely in the background.

I thought of how many other people there must be like myself who live continually in fear. Fear of the unknown, fear of the future, fear of losing their job, fearing of dying of cancer, fear of a helpless old age—

Now that was behind me. I felt like a character in a play, moving and speaking according to the author's will, oblivious to those around him. Life was going to be extremely simple.

Thoroughly tired and relaxed, I stretched out on the cot by the measuring machine, and fell immediately into a profound dreamless slumber.



The ringing of the telephone awakened me. For several seconds I listened without realizing where I was or what had happened to me. Then it all came back, the end of the world, no need to worry any more, et cetera.

"Hello," I grunted.

"Is that you, Latham?" It was Smedley calling, the young man who had recently been appointed instructor in astronomy.

"Yes."

"Well, I've been trying everywhere to find you," he complained. "You weren't at your apartment or the Observatory."

"Maybe that was because I was asleep here at the office."

"What was that?"

"I said MAYBE IT WAS BECAUSE I WAS ASLEEP HERE AT THE OFFICE!"

"Oh!" he exclaimed. He sounded slightly startled. "Then you didn't hear the ten o'clock news broadcast over KQX?"

"No, I didn't hear it."

"It was mostly about you," he chuckled. "I've heard some awful stuff over the radio but this takes the prize. Can't imagine how they could have gotten hold of such a story. Something about the sun turning into a fast nova."

"Possibly they got it because I gave it to them."

"You what!"

"Listen, Smedley: if I was quoted to the effect that the world is coming to an end then I was quoted correctly. That's exactly what I said and that's exactly what I meant."

"You aren't serious?"

"I was never more serious in my life."

He hesitated. "All right, Dr. Latham. I'm sorry to have disturbed you," and he hung up.

I have just figured up that there are less than forty-seven hours left now.

Friday morning, January 28

Catherine Snodgrass, president Bixby's secretary and one of the minor fuehrers at Western Tech, called me early this morning as I was finishing a pot of coffee and reading "Of Human Bondage." As usual, she was very definite and positive.

"President Bixby has arranged an appointment for you at ten o'clock," she informed me. "If you will stop at my desk, I will see that you are admitted without delay."

"Sorry," I said, "but I can't make it at ten."

"I beg your pardon."

People seemed to have trouble in understanding me lately. "I said I can't be there at ten. Tell Bixby I'll be there at eleven instead."

"The president is very anxious to see you. I would suggest that you come at ten," she said quietly.

"Sorry. Can't come till eleven."

There was a long silence pregnant with meaning. "Very well, Dr. Latham, I will tell him. Thank you."

There was no reason why I couldn't come at one time as well as another, except that I was seized with a perverse desire to frustrate the local hierarchy. I poured myself a fourth cup of coffee and went back to reading "Of Human Bondage," a novel I had been trying to finish for five years.

I had reached the part where Mildred is being particularly spiteful and was so absorbed that eleven o'clock came before I knew it. Previously I would have been sitting on the edge of a chair in the reception room ten minutes before time, but now I sauntered slowly over to the Administration Building.

Bixby was talking into a dictaphone when I came in. He is a large powerfully built man, with strong prominent features, and a crisp white mustache. Hair graying slightly at the temples. Most common remark heard about him is that he looks more like an international banker than a professor. It has been said that to be a sucessful college president, a man must have the digestion of a billy goat, the hide of a rhinoceros, and the money-getting powers of a secretary of the treasury. There could be no denying that as head of Western Tech, Bixby was an outstanding success.

He lost no time getting down to business.

"I believe I can say without fear or hesitation that no one has more vigorously championed the cause of academic freedom than myself. A scientist to be great must be free, at liberty to carry the bright torch of knowledge wherever nature beckons. These are truths upon which I am sure we are all agreed."

I nodded assent.

"At the same time," he said, clearing his throat, "we should be circumspect. In our relations with the man in the street, we must neither depict science as magic nor scientists as magicians, making stupendous discoveries. Otherwise the results of our labors are liable to serious misinterpretation by the ignorant and superstitious."

He frowned at me through his rimless glasses. "Dr. Latham, I feel very strongly that your message should have been submitted to the faculty committee on announcements before sending to Harvard."

He paused, evidently expecting me to say something in my defense at this point, but as I could think of no suitable rejoinder, remained silent.

"Now, Latham," Bixby continued, not unkindly, "I am familiar with your long and distinguished career here at Tech. Personally, I do not doubt for an instant that you had not the slightest intention of deliberately seeking sensational publicity. Unfortunately, the harm is done; the die is cast. The institution will be harshly criticized and justly so. Why, several big endowments I had been counting on may be held up if this thing gets out of control."

He got up and began pacing back and forth across the office. Suddenly he turned and confronted me.

"You spend a lot of time at the Observatory, don't you?"

"Yes," I replied, "my teaching duties have been very light in recent years."

"Often up there for days and weeks at a time?"

"That's true," I admitted.

"Just as I thought," he said. "You know, the man most likely to get his feet off the ground is the man who works alone. We need the contact of others to keep us on the straight path. Even the very best go off the deep end occasionally. If I remember correctly, Kepler was something of a mystic. Herschel thought the sun was inhabited. Sir Isaac Newton had a theory about light particles having fits." He stopped uncertainly.

I finished it for him. "And Philip Latham, associate professor of astronomy, thinks the world is coming to an end. It does sound kind of crazy, doesn't it?"

He looked down at me and smiled. "Yes, Latham, to put it bluntly, it does sound kind of crazy. Glad you see it that way."

He reached across the desk for pencil and paper. "Here. Suppose you write out something for the papers. No elaborate explanation, you understand; just anything to satisfy the reporters and calm down the people. Something about how new observations have caused you to revise your statement of yesterday, the sun is O.K., and looks good for another million years yet."

He went around to the opposite side of the desk and began arranging some papers together and laying them in metal containers. "While you're doing that I'll have Kit— Miss Snodgrass—call the press and issue a statement. Kill this thing right away."

I shook my head. "I am not aware of any new observational evidence," I said. "My statement of yesterday still stands."

"What's that?" Bixby said absently, continuing to arrange the papers.

"I said I have no intention of retracting my statement."

Bixby stopped suddenly as if unable to believe his ears. Then he walked slowly around the side of the desk, looming larger and larger, until he towered above me so high I felt like an ant. For an instant I thought he intended bodily violence. But when he spoke it was in a low tone, choosing his words very slowly and carefully.

"There's something I haven't told you yet. Neither the board of trustees nor the regents know anything about it. Nobody knows about it but myself." His voice sank nearly to a whisper. "There's a good chance of getting three million dollars out of Irwin Mills, the publisher, for a new observatory. Wants to establish it as a memorial to his son who died in the war." He leaned forward impressively. "How would you like to be the director of that new observatory?"

"It's a dream I've had for fifteen years."

Bixby slammed his fist into the palm of his hand. "Exactly!" he said. "We've been needing a new telescope around here for a long time. Present equipment in pretty bad shape. But here's the point: we won't get a nickel out of Mills if this wild story builds up. He'll think we're a bunch of screwballs and pull out on us. We can't always get things just the way we want them. A man's got to be reasonable—practical."

"That's what I'm trying to be—practical," I told him, "although not that it makes much difference any more."

I decided I might as well give it to him straight.

"You see it's really true, this wild story about the world coming to an end. As kids we read stories about the end of the world and all the different ways it could happen. But they were just words on a piece of paper born out of somebody's imagination. This is the real thing. Of course, you can't believe it. I can't actually believe it myself. We're all too engrossed in our own affairs, too colossally conceited, to believe that anything from outside could conceivably destroy the little world we have created for our special enjoyment and torment.

"That's the way it is," I said. "I'm afraid nothing we can do is likely to change the situation."

Bixby had remained impassive while I was speaking. Now he walked slowly to his desk and sat down.

"Then you refuse to co-operate." He said it more to himself than to me.

I shrugged. "Put it that way if you like."

"This can ruin us. Ruin me and the whole institution." He was studying me curiously, as if he had never really seen me before, and had just become aware of my existence.

"You're mad," he said dully.

I left him sitting there hunched over the top of his desk. For the first time I noticed how old and gray he looked.

At the office I found the postman had left a stack of letters for me. As I seldom receive mail, except copies of the *Scientific Monthly* and the *Astrophysical Journal,* I opened the envelopes with considerable interest. They were people who had heard about me over the radio, and felt impelled to take their pen in hand immediately.

Some of the letters were hardly more than scrawls written on the back of old grocery bills and wrapping paper. Others were neatly typed on fine stationery with impressive letterheads, such as Institute of Psychoelectrical Research, or Bureau of Cosmic Power and Light. Several writers inclosed pamphlets expounding their views in detail. Through them all ran the same theme. *I* have discovered the secret of the universe. *I* have refuted Newton's law of gravitation. *I* have found the law that explains the secret of the moon, sun, and stars. Three correspondents attacked me violently for trying to anticipate their own predictions of the end of the world.

I wondered why victims of paranoia with delusions of grandeur so often find in astronomy the outlet which their minds are seeking? Every professional astronomer receives such letters. I know a director of a large observatory who has been getting letters from an inmate of an asylum for years. It is useless to attempt to point out the fallacies in their highly systematized delusions. That is the worst trouble with these people, I reflected. They are the last ones to see anything strange in their actions.

Tossing the letters aside I reviewed the events of the morning. I admit I could not suppress a feeling of elation at my triumph over Bixby. Once I would have been utterly crushed by his tirade. Now it left me quite unmoved. What a surprise was in store for him tomorrow! I started to laugh out loud, then checked myself barely in time.

A psychiatrist had once told me that only the insane laugh out loud—alone.

Midnight

By evening my sense of elation had fled leaving in its wake a sense of deep depression. At the same time I was filled with a strange uneasiness which made my apartment seem intolerable. Ordinarily I avoid people, having a dread of crowds that amounts almost to a phobia. But tonight the thought of human companionship was very welcome. I decided to get the car out and drive down to Hollywood.

I found a place to park on Hollywood and Vine near the El Capitan Theater. Stopping at the newsstand on the corner I bought a morning edition of the *Chronicle,* which I thought should have my story by this time. Sure enough, there it was on the front page of the second edition. OLD SOL SET FOR BLOWUP! the caption read. Underneath was the subhead, World's End Due Saturday, says Dr. Latham of W.I.T.

Naturally I had assumed that nothing could compete with the end of the world for news interest. Yet I found my story was overshadowed by an account of a shooting that had occurred on the Sunset strip, which occupied practically all the rest of the page. Worse still, my photograph was displayed next to the principal in the shooting, a blond young woman in a playsuit. Anyone casually glancing at the paper would have gotten the impression that I was also concerned in the affair.

It seemed to me that all the stories I had ever read about the end of the world had been so different from the way this was turning out. In the stories there had always been wild tumult as the final hour drew near, half the people indulging in a frenzied orgy of pleasure while the other half offered up fervent prayers for deliverance. My prediction of the end of the world had now been broadcast over the radio dozens of times and widely publicized in the papers. Yet the only signs of tumult I could see were at the Chinese Theater up the street, where a premiere was trying to get under way.

Suppose, I said to myself, that I were to seize that young man there by the arm and try to explain to him I believed the end of the world was near. What evidence could I produce to prove my assertion?

I could tell him of observations made with my own eyes. . .

He would say I was lying; refuse to believe me.

I could show him Marley's notes.

They would be meaningless to him. A mere jumble of words and symbols scrawled in an old account book.

Finally, I could produce actual photographs of the spectrum lines.

Nothing but chance agglomerations of silver grains on a gelatin emulsion.

He would brush me impatiently aside, dismiss my story as fantastic, the product of too much port wine and brandy. Suppose I drank myself into unconsciousness tonight. Would I awaken tomorrow to find the same old GO star shining as usual, radiating energy at the rate of 1.94 calories per square centimeter per minute?

Driving up the winding road to the Observatory late that evening I determined upon my course of action next day. Writing it down here will serve to fix it in my mind.

The time of outburst based upon Marley's formula is 16:12 Pacific Standard Time, which is about an hour and a half before sunset at this time of year. If the cloud of gas expands at the average rate of six hundred miles per second, it will not reach the Earth's orbit for nearly two days. The intense heat pouring from the sun, however, as a result of the explosion will travel with the speed of light and probably render the daylight side of

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Earth scorching hot within a very few minutes. At any rate, after I detect the first signs of disruption in the monochromator there should be sufficient time for me to inclose this diary in a heat-resistant box and store it at the bottom of the suntower two hundred feet below ground.

Is it insane to hope that this diary will by some miracle be spared? Only too well I realize the futility of taking any precautions against a wall of flame that will turn the solid earth into incandescence. But in those last minutes it will at least be something to do, a definite plan to put into execution.

N Day.

08:00: The solar rotation has carried the large northern spot-group out of sight around the limb. The other spot has settled down to a stable beta-p group. Once again the face of the sun is normal.

I have just completed the routine program of solar observations that I have carried out continuously since 1906. First two direct photographs of the sun. Then a photograph in hydrogen light, a photograph in calcium, and a series on the prominence projecting around the limb. The plates have been developed and are fixing in the darkroom.

08:30: Observed a tornado prominence of moderate height at position angle 117°. Spiral structure well defined. Usual wisp of smoke issuing from top. No certain indication of radial motion or change in P. A.

13:17: The seeing has been dropping rapidly during the last hour, probably due to a wind that has sprung up from the west. The seeing was about 6 at noon but now is barely 2.

14:00: The image is blurred and lacking in detail. Sun has probably gone behind a veil of cirrus haze. Hope it doesn't get so thick I will have to close up.

16:12: The zero hour! And still the sun looks just as I have seen it thousands of times before—a cherry-red disk with a few dark prominences streaked across it.

17:00: Five o'clock p.m. on the Pacific coast. The image is very bad. Can't focus within three inches. Tower shaking in rising wind. Nothing unusual to report.

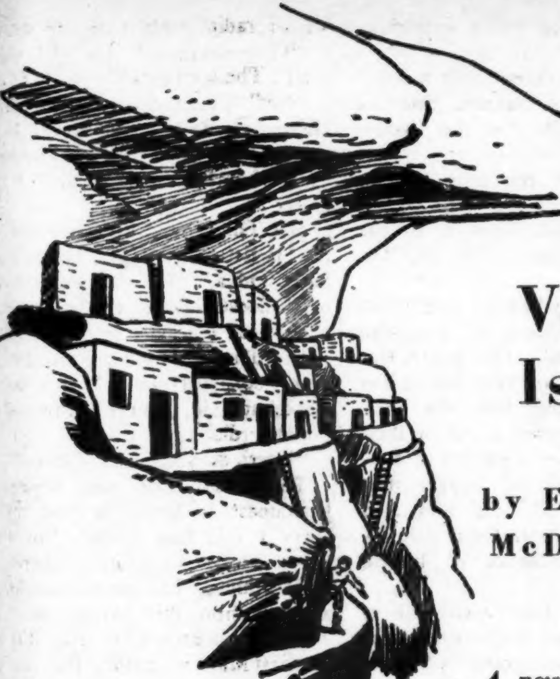
17:28: The sun will be below the horizon very soon now. I wonder if Marley's form—

Here it comes! The sun is swelling up like a toy red balloon. But so slowly! I never supposed it would be so slow. Like a slow-motion picture of the sun blowing up.

I am glad. I was never so glad of anything before.

Writing these last lines I thought of Bixby and Smedley and all the rest. Trying to picture their faces made me laugh. I laughed long and loud till my sides ached, and the sound echoed back and forth between the empty walls of the sun tower.

THE END.



Veiled Island

by EMMETT McDOWELL

A new author presents a tale of a new kind of superman, a cannibalistic, savage, dirty barbarian. But it isn't what a race knows that counts; it's what that race is.

Illustrated by Williams

Gabriel Clyde, D.Sc., flicked pale-blue eyes to the gauge, said in a matter-of-fact voice: "The fuel's running low. If we don't sight the island before noon, we'll have to turn back." He cramped his long, loose-jointed frame into an even more uncomfortable position behind the helicopter's controls, added dryly: "Harriman's a congenital liar anyway."

There were two passengers in the cabin beside the pilot: a man and a girl. The man had a black spade beard, thin white face, black eyes. He turned away from the window where he'd been examining the Great Swamp of Venus beneath them, said, "Um," in a suspicious voice.

"Of course, Harriman's a liar," interposed Meg Duschene. She was lecturer in Biology at the Venusport Academy of Sciences. "But Harriman isn't the only Terran who's seen the island, Gabe." She turned her head, birdlike, to the black-bearded man. "Is he, Dr. Wotten?"

"No-o. The island's a pretty well established tradition in Venusian folk lore, Gabe." His beard lent the doctor a mature look, but he was little if any older than the pilot. Both men appeared to be in their middle thirties. "A garden of Eve, where the Venusians believe they originated. Eberly saw it in 2401 when he flew over the Great Swamp. He reported evidence of human habitation then."

"Sure, sure," interrupted Gabriel Clyde. "I don't doubt the island exists. But we're going by Harriman's directions. We're already a hundred kilometers beyond the point where Harriman claimed he saw it."

The black-bearded man and the girl exchanged significant glances.

Gabriel Clyde could sense their ill-concealed antagonism. He shrugged, said: "If the fuel gives out before we make it back to the mainland, we're sunk. We wouldn't last an hour afoot in that Mesozoic paradise. Look at that!"

Directly beneath them a huge saurian was wading half submerged across a channel of open water. At the approach of the low flying helicopter it flung itself upright, jaws gaping, hissing like escaping steam.

"Tyrannosaurus!" the girl shivered. "Nasty brute!"

"Not Tyrannosaurus himself." Gabriel Clyde kept the copter hovering above the fifty-foot monster. "His Venusian counterpart." He eased the copter back onto its course, said over his shoulder to the black-bearded man: "Better turn back, Oliver. We can leave some of the equipment at the base, try it again with a heavier load of fuel."

Wotten drew his black brows together distrustfully. "Look here, Gabe," he said, "you're not trying to double-cross me, are you?"

"What do you mean, Oliver?"

The black-bearded man frowned, hesitated. At length he said: "I'm sorry I said that, Gabe. But I'm upset. The Venusian Anthropological Society has spent a considerable sum on this expedition. If what Harriman says is true, it'll be the first time in history that we've had a chance to study a race just emerging into true men. I'm nervous. That's all, Gabe. Forget it."

"No," said Gabe. "You've been suspicious of me since the expedition started. What's in your craw, Oliver?"

Dr. Wotten flushed, then shrugged his thin shoulders. "I've felt—Well, frankly, Gabe, I've felt that you resented the fact that the Society put me in charge of the expedition. You are their field representative. I suppose it did seem unfair to you for the Society to get someone from the Academy."

Gabe didn't say anything. It was true that he'd considered Wotten a poor choice. He had remembered the anthropologist at the Venusport Academy of Sciences as a thin, intense young man. He'd been cultivating his beard even then. Gabe had gone into field work, but Wotten had stayed with the Academy. It was hard for Gabe to realize that the doctor was now head of the anthropological department. Nevertheless, Wotten's training was purely academic. He knew nothing of field work; in fact, was ill-fitted for it physically.

The doctor, tugging at his beard, went on uneasily: "I . . . well, it occurred to me, we've come over a thousand kilometers from the base. A degree or two in our course could throw us hundreds of kilometers off the island. I'm not accusing you, understand, but I'd look pretty foolish if I couldn't even find the island."

"So that's why you and Meg have been watching me like a pair of hawkshaws," said Gabe in an amused voice.

Dr. Wotten shut his mouth with a snap.

"Some day," said Meg Duschene, "I'm going to stick you with a pin, Gabe. Just to see if that composure of yours can be ruffled. You're a cucumber."

"That's because you're the adrenalin type," he assured her imperturbably.

"Adrenalin type?" She looked puzzled.

"Sure. Look at those freckles. Naturally curly brown hair. Quick brown eyes. Pert nose." He ran an appraising eye down her boyish figure. Like the doctor and himself, she was wearing white shorts and blouse. "And other obvious symptoms," he added.

"So?"

"The conclusions are obvious." There was a gleam in Gabe's pale-blue eyes. "You're the tomboy type. You would've paraded for woman suffrage back in the nineteenth century. Masculoid. Dominating. Now that you've gained equal rights, you want to prove yourself better than man."

"Is that all?"

"I nearly forgot," he grinned. "There's a very high tendency towards nymphonmania among the hyper-adrenal types."

"Don't get hopeful," said Meg coolly.

The doctor leaned forward suddenly; gripped Gabe's shoulder, said in an agitated voice, "Look! Look, Gabe. What's that?" and pointed to the left.

Gabe saw a misty range of hills, their crests brushing the low cloud blanket which hid Venus eternally from the sun. They rose like islets from the sea of swamp and jungle.

"Looks like my Machiavellian scheme's come to naught," he said solemnly and winked at Meg.

Dr. Wotten, though, was too perturbed to notice. "Veiled Island! Have we enough fuel to make it, Gabe?"

"Sure, sure."

Gabe pointed the helicopter toward the distant hills just visible through the steaming atmosphere. Several drops of water splattered against the plastic windshield. Then a curtain of rain blotted them out.

"Don't lose them!" The doctor was in a fever of excitement. By Jove, Gabe, d'you realize that range of hills might hold the secret that's baffled science since the time of Aristotle? Could the Dutchman, Hugo de Vries, have been right, do you think?" He tugged nervously at his beard. "Was the first true man a mutation?"

"Not likely," Gabe grunted, "seeing that similar life forms evolved on Venus and Earth quite independent of each other."

The squall, he saw, was dwindling. In a moment the hills were visible again, closer, better defined. He could make out valleys and wooded slopes. Tendrils of vapor drifted up to meet them from the steaming swamp.

On Earth, he thought, evolution had passed more or less progressively from stage to stage. Species had evolved, become extinct, their places taken by variations better fitted to survive in a changing environment. The anthropologists had been left only a scant handful of bones by which to trace man's descent.

But Venus! Venus was the anthropologist's bonanza. Life on Venus kept repeating itself. Each step in man's progress was represented by living peoples, passing slowly through Eolithic, Paleolithic, Neolithic cultures. And always succeeding cultures arose in the Great Swamp, pressed outward against the older races.

From Venusport on the opposite side of the planet, surrounded by semicivilized feudal states, one passed successively down a descending evolutionary scale until the northwest boundary of the festering sore, the Great Swamp, was reached. Venus hadn't started man up the evolutionary scale once, but a hundred times.

And if what Harriman claimed was true, it was doing it once again.

He caught sight of a grotesque winged crocodile as it rose ponderously from the swamp ahead of them. He said: "Get the rifle, Meg! Here comes another of those flying reptiles!"

"Where?"

The girl snatched the heavy express gun from the floor beside her, slid open the window. Hot damp air, bearing the fumes of sulphur, swirled into the cabin.

"Dead ahead'" said Gabe and slewed the helicopter around. "It's just topping the foliage."

Dr. Wotten shouted in alarm: "Get in the clouds, Gabe!"

Gabe ignored him. The pterodactyl hunted as much by sound as sight. They'd be an easy prey in the blinding cloud blanket. A glance at the gauge assured him the fuel was too low to attempt to outdistance it and still return to the island.

The grotesque reptile was flapping upward, trying to outreach them. They were, Gabe realized, dangerously close to the tenuous lower level of the cloud sheath.

He said, "Ready, Meg," and glanced at her questioningly.

Her brown eyes sparkled as she

pressed her cheek to the stock. She pushed back a wisp of hair from her forehead.

"Ready!"

Gabe slipped the helicopter down and sideways beneath the wheeling reptile. He heard the rifle explode deafeningly. Acrid powder smoke burnt his nostrils.

"Missed!" said Meg and fired twice more.

The doctor leaped to his feet in panic.

"Get down!" Gabe shouted. From the corner of his eye, he saw the wounded monster hurtling straight down into the whirling blades. He tried desperately to swerve the copter aside.

"Pull your head in!" he shouted at Meg.

There was a rending jolt as the pterodactyl plunged through the blades. The controls went dead. Gabe felt the helicopter tilt, fall free. Then they were crashing through the tangled foliage of the swamp. With a loud "plop!" the plane pancaked bellyside down in a pool of mud. Mud leaped in solid sheets past the windows.

Gabriel Clyde shook his head groggily. Mud was welling up through the splintered floor plates. The plane, he realized in dismay, was sinking. He leaped to his feet.

"Quick!" He flung up the hatch in the ceiling of the cabin. "You hurt, Meg?"

Meg Duschene stared at him wide-eyed. "I . . . I don't know!"

Gabe didn't give her time to make up her mind. Boosting her rudely to the roof of the cabin, he untangled Dr. Wotten, thrust him after her, then skinned out himself.

The mud, he saw at a glance, was sucking the helicopter under rapidly. The foul smell of sulphur dioxide bubbled from the quagmire, insulted his nostrils. They had plunged almost into the center of the bog, but the limb of a gnarled mangrovelike tree extended across the tail. He ran out on the fuselage, grabbed the limb.

"Get a move on," he commanded the others tersely. "The helicopter's gone. This muck's worse than quicksand."

Meg teetered out to meet him. She was followed by the doctor. Wotten hadn't uttered a word since the crash. There was a glazed look in his black eyes, and he kept chewing on his nether lip. The plane was three-quarters submerged already.

Gabe helped the girl scramble onto the limb. She wormed her way up to the huge bole, then gave a hand to Wotten who was inching along on his belly.

Gabe swung up last. He looked at the disappearing plane with thoughtful blue eyes. A thousand kilometers of reptile-infested swamp barred them from the mainland, and they didn't even possess a knife.

"It's gone," said Wotten in a stunned voice.

The mud had already closed sluggishly above the twisted blades. Only a few broken limbs overhead attested that there'd ever been a helicopter.

Meg looked questioningly at the doctor. But the catastrophe had been too swift; too far-reaching for Wotten to grasp its full signifiance.

"We can't stay here," he said tentatively and glanced at Gabe for confirmation.

"No. But the island's less than a kilometer away."

"I suppose there isn't much likelihood of being picked up."

Gabe shook his head.

"Why not?" Meg was slapping at the clouds of stinging insects already swarming about her bare legs. "Don't you think they'll search for us? That's silly."

"They'll look. But there's about five million square kilometers of swamp to search. Meanwhile, we'd better try to make the island.

Meg's brown eyes widened in consternation. "But . . . but—We haven't food or fresh water or . . . anything.

Gabe said dryly. "We'll meet the primitives on their own social level for a change." He smacked his lips. "I've heard grubworms are quite nourishing."

"That's a comfort!"

Dr. Wotten was regarding the matted undergrowth, the treacherous channels of stagnant water all about them. He turned to Gabe with a helpless air.

"But how are we going to reach the island?"

"Walk," said Gabe and dropped to the muck at the base of the tree.

They skirted the bog where their copter had sunk. They floundered ankle deep, knee deep, waist deep in ooze. Wisps of vapor rose from the pools. The morass was rank with the smell of rotting vegetation, and it was hot. Trickles of sweat washed streaks through the mud with which they were plastered solid in the first half hour. After a while, it began to rain again.

Meg, surveying her mud-coated limbs with distaste, said: "It baffles the bugs anyway," and paused to allow Dr. Wotten to catch up. The doctor's beard was stiff with mud. He looked wretched.

"Hey Gabe!" he panted after the gangling figure of the pilot. "Not so fast. I'm fagged."

"There's high land just ahead." Gabe kept doggedly on. "It's the island. Veiled Island!"

The doctor sighed, struggled after him. "If we don't keep up," he said to Meg with a whimsical expression, "that long-legged crane's going to lose us."

With a shout, Gabe disappeared up a bank. The doctor and the girl scrambled out of the swamp on his heels, flung themselves wearily to the ground. The rain was passing, but the vegetation still dripped uncomfortably.

"Dirt!" panted Meg. Good solid dirt!' I never knew I was so attached to it."

"There's quite a bit of it attached to you too," said Gabe dryly.

They were, he saw, on the jungle clad, lower slope of a hill which towered above them into the clouds. Brilliant plumaged birds, like parrots, flitted squawking among the upper branches. A short distance off, he partially glimpsed a crystal rivulet as it tumbled down the slope, leaped sheer over a ledge with a sparkle of spray.

"Water!" cried Meg, springing to her feet.

"Don't drink that," said the doctor sharply. "It hasn't been analyzed."

"Who said anything about drinking it. I'm going to scour myself free of this mud. If it sets before I get it off, I won't be able to bat an eyelid."

Gabe had listened to the doctor's objection with a sense of wonder. It would be a long time before they would have anything else to drink. "Hold on," he commanded Meg sharply.

She paused, frowned, "What now?"

"I hate to be a killjoy," he replied dryly, "but unless you want to be the appetizer at some saber-tooth tiger's dinner, you won't go wandering off like that!"

"Oh!"

"Listen," he went on in a grim quiet voice, "both of you. We're remarkably ill-fitted to survive in a savage environment. Our sense of smell's atrophied, our hearing's blunted. Even our sight isn't particularly sharp when you compare it with any of the animals. We've got to stick together. We can't go traipsing off singly as if this were Venusport."

"Certainly not," agreed Dr. Wotten with a wry grin. "My dear Gabe, you couldn't pry me out of your sight. Frankly, I'm terrified."

"All right," said Gabe, "now that that's understood, we'll investigate the stream. We can all stand a dip."

He led the way cautiously through the jungle. The spongy damp mold absorbed the sound of their footfalls like a carpet. He paused suddenly, holding up his hand for silence.

The waterfall dropped into a limpid pool ringed with gravel. On a log, half submerged, crouched a motionless apelike creature. It was peering intently into the pool. All at once, the ape's hand flicked down, scooped a shower of water and a flopping silver fish onto a gravel bar.

"By jove!" exclaimed Dr. Wotten, startled; "did you see that?"

At the sound of his voice, the ape flashed around, snarling. It was only about four feet high, hairy, with well developed legs for a lower primate. For a second it stared at them, then slipped off like a shot into the underbrush. The fish flopped twice more, disappeared into the pool.

"A ground ape!" exclaimed Meg.

Gabe regarded Dr. Wotten with annoyance, said: "These animals aren't at a zoo, Oliver. That might have been a ground ape. It also might have been a primitive species of man."

The doctor looked crestfallen.

Meg said in a disappointed voice: "You mean that timid little thing was a caveman? You've just shattered one of my pet illusions. I've always imagined them, big, muscle-bound brutes, ready to drag the first likely wench off to their cave by the hair of her head."

"Wish-thinking," said Gabe.

Meg looked at him scathingly. "One of these days, I'm going to forget I'm a lady," she said, "and give you a good swift kick where it'll do the most good."

Wotten tugged at his muddy beard. "I wonder, Gabe, if that's what Harriman saw?"

"It's hard to say what Harriman saw. That space trotting publicity hound would tell anything to rate a line over the newscasters. He talked about a hairless primate, though, with an abnormal brain capacity. More along the lines of the Cro-Magnons. That specimen was pre-Neanderthaloid, if it was anything but a ground ape."

"Do you suppose it'll come back, Gabe?" Meg asked.

"Probably not."

Meg didn't appear satisfied. "If you'll watch," she said hesitantly, "I'll wash this mud off."

"I'll watch with pleasure," he assured her solemnly.

"I didn't mean that! I think you're horrible. Because we've been reduced to primitive circumstances doesn't give you an excuse to act like a savage."

Wotten was combing his beard nervously with his fingers. He said: "I don't know, Meg."

"What?" cried the girl wheeling on the doctor. "You, too?"

"Basically, Meg," he explained, "we haven't progressed very far beyond that ape. Oh, I know we've made monstrous strides in science. But emotionally we're still savages. We're not rational beings at all; we're emotional animals."

"Maybe you're apes; but I'm not!"

"A difference in degree, not in kind," interposed Gabe. "You're a biologist, Meg. Has there been any fundamental variation in human physiology for the past ten thousand years?"

"No-o," she admitted in a doubtful tone.

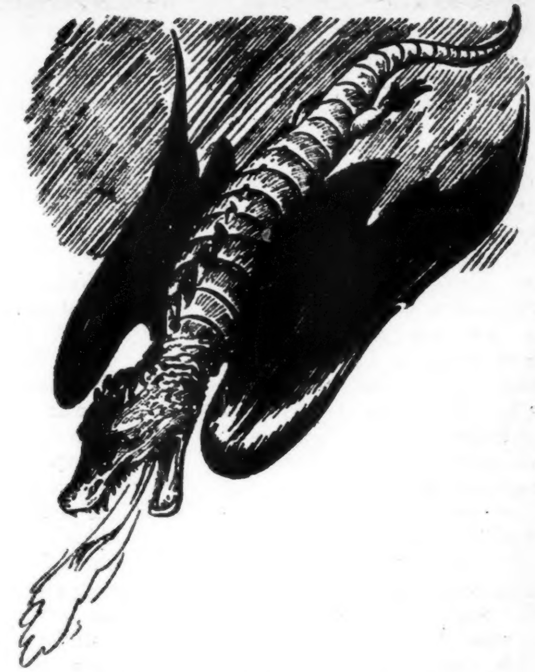
Dr. Wotten said shrewdly: "If you look at man as he is, Meg, and not as you'd like him to be, you'd perceive the basic behavior patterns. Primitive man was promiscuous. So was man in the twentieth century when the customs of marriage and monogamy were enforced by law. We've inherited a bundle of emotions that we can't slough off. Everything's colored, more or less, by them. They make us biased, subject to mass hysteria, unable to take an unprejudiced viewpoint. And in all the millions of years since man first appeared, we haven't evolved a single species free of this emotional block."

"In a nutshell," said Gabe dryly, "civilization's a veneer." He made a face at her, savage, gloating. "And I can feel it peeling!"

Meg took a backward step. "Control yourself, Gabe."

"Oh, don't worry," he replied with a cool chuckle. "It'll probably peel off you first. Women are much closer to the savage than men. Go take your dip.

While Meg splashed in the pool, Gabe and Wotten kept a wary eye on the wall of greenery. Except for



the twittering of birds as they flashed through the foliage, the jungle was as silent as outer space.

Meg emerged, wet and glistening. "Boys" she called gayly, "the bathroom's yours."

The two men waded into the pool, scoured off the slime of the swamp. Refreshed, Gabe swam about. When he climbed from the stream, he scoped out a shallow hole about ten feet back from the edge. He dug it with a stick, bailed out the muddy water as fast as it oozed from the pool until it came clear and sweet.

"Go ahead; drink it," he advised them. "That's filtered through ten feet of dirt and gravel. It's pure as anything you're likely to get for a while."

Meg made a *moue* of distaste, lay stomach down, drank. "I feel like I've already slipped back about nine thousand years." She wiped her mouth with her arm.

Dr. Wotten scrambled to his feet, sputtering, his beard wringing wet. "I'm afraid I don't adjust very fast." He looked about the pool. "This is a pleasant spot. Do we make this our headquarters, Gabe?"

"No. Too close to the swamp."

He realized that both Wotten and Meg unconsciously were putting themselves in his hands. The dim twilight, he saw, had begun to creep through the jungle. Swamp fire, the phosphorescent glow which ninety percent of the Venusian vegetation radiated after nightfall, was glimmering in the depths of the swamp. A game trail, he noticed, parelleled the stream up hill.

He said: "I'd like to find a cave. A cave with too small a mouth for the larger carnivora to force an entrance."

All at once, Meg screamed, pointed over his shoulder.

Gabe whipped around. A vine was swaying violently. Otherwise, there was nothing to be seen.

"What was it?"

"Th-th-that ape! He was staring at us!"

Gabe could feel the hair crawl on the nape of his neck. He said, "We'd better locate some kind of shelter right away," and started to lead the way upstream along the game trail.

"Gabe! Gabe!" Meg shrieked. "Look out!"

A hairy shape plunged silently on his shoulder, knocked him sprawling. A second and a third ape dropped like ripe apples from the tree overhead. He kicked one of the creatures in the belly, bridged his back, tried to whip free.

He heard Meg scream again; the doctor snort in terror.

He thrashed wildly against the hairy shapes, conscious of other apes attacking Wotten and the girl. He butted one of the simians in the mouth, smashed his elbow in another's eye.

Then they had him pinioned securely to the ground. He couldn't move. Panting, trembling with exhaustion, Gabe relaxed limply.

The apes yanked Gabe to his feet, held him tight by either arm. Wotten and the girl, he saw, had been treated in the same fashion. The bridge of freckles across Meg's nose stood out starkly against her bloodless features.

Dr. Wotten said in a hoarse whisper: "What d'you suppose they'll do with us, Gabe?"

He shook his head.

They had been captured, he perceived, by a band of males. The apes were without weapons, without clothing. They chattered, barked excitedly among themselves, supplementing what seemed to be a meager language by means of signs.

He said, "I don't know whether they're ground apes or submen."

It was growing steadily darker. With the waning light, Gabe realized, a pronounced nervousness had begun to take possession of the apes. They began to retreat up the game trail, dragging their captives along with them.

Meg set her mouth grimly, stiffened, refused to budge.

"Don't antagonize them!" Gabe warned her sharply. "I think they're in a food gathering stage of culture. They seem peaceful enough, but it might be dangerous to oppose them now. They're frightened at something." He couldn't resist adding, "Weren't you looking forward to a caveman hauling you off by the hair?"

Meg bit her lip, said gamely, "I can change my mind, can't I?" but submitted to being pulled along the trail.

As they advanced inland, the trail climbed sharply upward. Walls of rock began to hem them in on either hand. They crossed the stream six times in half a kilometer.

The ape men urged them along, faster and faster proceeding at the same time with greater stealth. Behind them a fearsome cacophony of roars and squeals drifted up from the primeval slime. The swamp was waking.

"What are they afraid of?" asked Wotten querulously. "I haven't seen any signs of predatory animals."

"Hush!" cautioned Gabe. He'd noticed the ape men were silent, their chattering barking conversation stilled. They crept along the trail like wraiths.

An ear-splitting yowl suddenly burst on Gabe's eardrums. It seemed right beside him. He jumped as if shot. Then a huge black striped form bounded from the undergrowth full upon the leading ape man.

"Tiger!" cried Gabe, springing backwards into Meg.

The ape men scattered right and left into the brush—all except one. Gabe, the doctor and Meg found themselves alone on the trail. The gigantic sabertoothed tiger glanced up at them from his kill, snarled, tusks gleaming. Gabe's stomach went hollow, his mouth dry. Sweat broke out on his forehead, dampened the palms of his hands.

Then the tiger seized its victim in its mouth like a cat carries her kittens, bounded out of sight into the underbrush.

"D-d-do you realize that beast could have picked any one of us as well as that ape?" Meg chattered.

Dr. Wotten's mouth was open, his hand pressed to his heart. He didn't say anything, just gaped like a fish.

Gabe drew a long breath. "We seem to have been abandoned." He peered about in the gathering night. Meg's face was a pale blur. "I can't say we're any better off."

"Frankly," said Dr. Wotten in a weak voice, "I wish the beggars would come back. I don't relish spending the night in the jungle." Meg clapped her hand to her mouth, half screamed. "They are back!"

Silently as drifting clouds, Gabe realized, the ape men had closed about them again. They made soft clucking noises, plucked at their garments.

"They act friendly. I believe they grabbed us in the first place out of curiosity!"

"Don't argue with them," said Dr. Wotten and began to follow the ape men. "We're happy to accept their hospitality."

* * *

A kilometer farther, the ape men left the main stream, turned off into a side ravine. It was a box canyon, Gabe saw. The apes paused before a narrow cleft in the rock. The cold glow of the phosphorescent plants lit the canyon floor as bright as the full moon on Terra.

Gabe was conscious of furtive movement within the cleft. One by one the ape men slipped inside. He swallowed dryly, squeezed through the slot. Meg and Dr. Wotten trampled his heels in their fear of being left outside alone.

The cavern, he sensed, was large, dimly lit by a species of phosphorescent fungus which grew on walls and ceiling. The floor was dirt. He felt hairy fingers snatch at his clothes, heard Meg draw in her breath sharply. Then his eyes began to adjust to the semidark.

Forty or fifty of the apes clustered about them chattering, fingering their shorts and blouses curiously. They were naked, hairy. He could see no signs of fire or implements.

He said: "They seem friendly enough; just curious."

"And ripe!" Meg wrinkled her nose. The stench of decayed flesh, of human sweat and filth hung in the close air like a fog. "I'll strangle if we stay here."

There was a ripping sound.

"Here!"

Dr. Wotten, Gabe perceived, was struggling valiantly over his shirt with one of the ape men. The hairy primate had divined that the shirt was detachable and had torn it off. The doctor proved to be no match for him. With a lunge, the ape got possession of it, skipped away trying to get its head through the sleeve.

The rest of the tribe had been watching interestedly. With a rush they swarmed over them, yanking at their clothing. In something less than a minute they found themselves stripped to their hides. The apes danced about in glee, trying to don the mangled garments, snatching them from each other, quarreling over patches of the cloth.

"Imitative," said Gabe in a dry tone.

The doctor tugged at his beard, looked utterly dismayed. "I feel uncommonly like a plucked chicken.

"You look like one," said Gabe unfeelingly. He was not overly concerned about their nakedness. The Plastic Age, inaugurating a pagan era of sun worship, had destroyed the last vestiges of prudery about the human body. But their clothes did afford them some protection.

Meg said, "They could have given me a fig leaf," in a faint voice.

Dr. Wotten watched their clothes shredded into ribbons as the apes fought over them.

"Our last link with civilization!" he blurted out. "We're at the beginning! We have to climb the same trail that took our forebears a million years!"

"We've some advantage," Gabe pointed out dryly. "At least we know about fire and weapons and have some idea how to produce them."

"Applied anthropology!" said Meg with a nervous giggle.

"Exactly."

"The submen, Gabe noticed, held themselves loosely in two groups, females and children in one, bulls in the other.

"Oliver," he said to Wotten, "see how the tribe is split up?"

"I was wondering about it." The

doctor had calmed down enough to take interest in his surroundings. "They must be entirely promiscuous, a stage in human culture we've been able to adduce but never verify."

"Then you think they're submen?"

"Yes. But of a more primitive specie than we ever discovered fossilized remains."

"I'm hungry," Meg interrupted.

Gabe looked at her blankly, turned back to the ape men. They were losing interest in the rags, he saw, and wandering about the cave. There were no old people. One by one the submen began to curl up on the dirt floor, drop off to sleep like animals.

"I'm hungry," Meg insisted. "It's been over twenty hours since we've eaten."

"So am I," Gabe replied coolly. "What'll you have? A juicy grasshopper? Or maybe I can catch you a mouse."

Meg shuddered.

"You're not hungry yet," said Gabe.

"Frankly," said Dr. Wotten, "I'm so tired I couldn't eat if we had anything."

Gabe glanced toward the rear of the cavern. "None of our friends seem to be sleeping back there. I suggest we try to get some rest." He led the way, found a high dry spot of dirt. A bat, suddenly disturbed, flitted past them.

"Tomorrow," he said stretching himself with a sigh on the ground, "we start back up the path to civilization."

Venus revolves on its axis once every fifty-two hours. Though the doctor and Meg as well as Gabe had long since adjusted themselves to the long days and nights, they slept but fitfully. They were up at the first glimmer of light.

Meg yawned, said: "Between that wretched dirt floor and the gnawing of my stomach, I didn't close my eyes. I'm ravenous."

Dr. Wotten groaned, dragged himself to his feet. "I feel like my bones have fossilized. What's first on the program, Gabe?"

"Apparently, they don't furnish board with their lodging." Gabe frowned at the ape men who were drifting a few at a time out of the cave. "We'll have to rustle up grub for ourselves. I'd like to try to make a spear after that, maybe even a bow."

"What should I do?" asked Wotten helplessly.

"You and Meg gather a few tons of that moss," he said wryly. "It ought to make a better bed than the ungarnished dirt. I'll scout about for food."

He went to the entrance, paused, added: "Don't get too far from the cave. Remember, you're not the only creatures with appetites on the island."

Gabe's first act, once out in the misty daylight, was to find a club. Thus armed, he set out down the canyon for the stream. His feet proved to be extraordinarily tender. He thought that the apes could have left him his shoes at least.

An outcropping of flint along one

wall of the canyon caught his eye. Arrowpoints, knives, scrapers could be chipped from flint. He crossed to the ledge eagerly. To his surprise, the flint outcropping showed signs of having been worked and abandoned. Yet the ape men had no artifacts of any kind. Who then had worked the flint bed?

Still puzzling over the problem he reached the main gorge, bathed and drank from the stream. The water somewhat alleviated the gnawing of hunger.

Their predicament, he pondered soberly, was little short of catastrophic. Naked and unarmed, they'd been set down in a primeval savage world where Darwin's "survival of the fittest" operated with alarming finality.

He felt that there was little hope they'd be picked up. Even should the rescue planes discover the island, the hills were so broken and jungle infested that there was scant likelihood that they'd be spotted.

A patter in the thicket to his right interrupted his reflections.

"Game!" he thought. He seized his club, moved stealthily as a cat to the edge of the thicket, parted the branches.

A narrow trail was revealed, down which he saw seven diminutive three-toed horses trotting past to water. Miohippus! He leaped squarely into the center of the trail.

The ponies stampeded back towards him like startled rabbits. Gabe smashed out with his club. He caught the foremost brute on the skull, stunned him. The others bolted past to safety.

With a grimace of distaste, he dispatched the three-toed horse before it could regain consciousness. It would provide both food and clothing for the three of them. He started to shoulder the primitive little beast, heard a low snarl behind him.

Gabe dropped the horse, whipped around.

It was one of the ape men, he realized. The hairy little primate crouched in the trail where it had first stepped from cover. It snarled again, sidled closer. Grabbing the Miohippus by the hind leg, it began to back away.

Gabe stared, amazed at the creature's affrontery. Why, it was robbing him of his kill! With a roar of rage, he reverted completely to the primitive, fetched the ape a wallop on its skull, stretched it unconscious beside the horse.

He was overcome at once with chagrin. The tribe must be ravenous for meat. They weren't hunters, but foodgatherers and scavengers. He sprinkled water from the stream over the subman's face until it returned groggily to consciousness.

It scrambled to its feet rubbing its hairy pate. It regarded Gabe with an air half frightened, half placating.

Gabe said, "Come along, Shorty," and shouldered the horse. "I'll stand you a dinner when we butcher this beastie."

Drawn by the scent of meat, the ape man tagged along behind, but at a safe distance.

Gabe was almost back to the cave when he spied a plant with broad rubbery leaves. He devised an apron of the leaves and a length of creeper, which improved his spirits no end. It would last, he hoped, until he could manufacture something a little more durable from the pony's hide.

It was strange, he reflected, the importance clothes had begun to assume. If he'd been of a more prudish era now, it would be understandable, but— His thought trailed off as he discovered his companions resting comfortably beneath the shade of a tree.

Meg, he saw, had contrived a sketchy attire of grass. The doctor, though, hadn't managed so well with his leaves. He looked like a moulting chicken. Clothes, Gabe thought suddenly, were the aborigines badge of caste, the symbol of their elevation above the animals. Their urge to clothe themselves must be a reversion to the primitive!

"Hello," Meg sang out. She and the doctor were munching amber waxy berries. There was a third pile untouched on a broad leaf.

Gabe dropped the horse at their feet, asked, "Got the moss gathered so soon?" in an ominous voice.

"No." Meg shook her head. "It smells too bad in there. We thought we'd try to find another cave. How did you have the heart to kill that darling little pony?"

"It's food and clothing."

"Who's your pal?" She pointed to the ape man. He was drooling hungrily in the direction of the horse.

"Oh," said Gabe, "excuse me. This is Shorty." He scratched the dawn man behind the ears. Shorty produced a horrible grimace in imitation of Gabe's grin. "I invited him to dinner."

Meg shrank back in fright. "He looks like he'd bite!"

"I doubt if you'd appeal to his taste." Gabe lowered himself to the sod. "How do you know these berries aren't poisonous?"

"I saw the apes eating them," explained Meg triumphantly. "You aren't the only one with initiative."

Gabe grinned faintly, turned to the doctor.

"Oliver, I noticed a vein of flint a short way down the canyon. It had been worked, but not recently. What do you make of it?"

"This."

Gabe had noticed the doctor's excitement before. He was holding out a crudely chipped flint knife.

"I found evidence of smoke on the ceiling of the cave after you left this morning, Gabe. I scratched around in the dirt, unearthed this knife."

Gabe turned the artifact over and over. It was flat, pointed at one end, rounded at the other and about seven inches long.

"Rather crude work. Early Paleolithic, don't you think?"

"Yes, yes," Wotten agreed eagerly. "Bears a striking resemblance to the Mousterian flints found on Earth. It poses an interesting question. Would you say the ape men are a degenerate species who formerly possessed the knowledge of fire and flint work, but have forgotten it? Or did a more advanced race occupy the cavern at one time?"

"I favor the theory of the advanced culture who've migrated." Gabe was eying the three-toed horse speculatively. "I'm going to skin that beastie."

"Good heavens!" burst out Meg. "Not with that rock?"

"Why not? The cavemen did."

He turned the Miohippus onto it's back, clumsily split the hide down the inside of each leg, peeled it back like a glove.

"I wouldn't have believed it could be done," exclaimed Wotten in an astounded tone.

"Quit dreaming," Gabe grunted, "and give me a hand. Get hold of the hind legs—both of you."

Meg took one of the legs gingerly, Wotten the other. Gabe hacked an incision down the horse's belly from tail to chin. It took them almost an hour, but between the three of them they got the hide off in one piece.

The smell of the blood nearly drove Shorty mad, but he'd developed a great respect for Gabe's club. Gabe hacked off a hunk of meat, tossed it to him. The ape man wolfed it growling.

"Want a bite?" Gabe asked Meg.

She made a grimace, shook her head.

Dr. Wotten said, "I'm fairly drooling at the thought of charcoal broiled horse steak. I've heard of producing fire by friction. It was employed by the Neolithic peoples. The drill method."

"Ever tried it?"

"No-o," Wotten admitted.

"I have," said Gabe. "We haven't advanced that far yet. We'll eat our horse raw."

He began to peg the hide to the ground, flesh side uppermost. Then with the blunt end of the scraper, he set to scraping off particles of fat.

Meg said desperately: "Give me a taste of that meat, Gabe. Those berries weren't very filling."

With a grin, he cut them each a strip. The ape man swallowed his whole. Meg and the doctor sampled theirs with less enthusiasm.

"It's not bad," said Meg in astonishment.

"No," agreed the doctor; "but I'm afraid I'll never learn to growl while I eat it."

"You will," said Gabe. "You will." He cocked his head, eyed Meg's figure with a frown of concentration. The grass skirt did little to conceal it. The girl, he realized, was lithe, firm, but satisfyingly feminine.

Meg said uncomfortably: "It's not very practical, is it? The grass skirt, I mean."

"That depends on its purpose," he replied dryly. "But I was trying to figure how to cut this hide so it would stretch for the three of us and still satisfy the demands of decency."

"Decency?" mused Wotten. "The word's obsolete. Do you realize, Gabe, we're showing a definite regression to the primitive?"

"I was thinking of that when I found us all sprouting foliage like

Adam and Eve after the fall."

Meg wasn't listening. Her enthusiasm had been fired by the possibilities in the dun colored hide.

"Look," she interrupted, sketching a pattern roughly triangular in the dirt. "It's simple. Two pieces like this sewn together in the stride and laced up the hips. That ought to do, and it won't use up much skin."

"Won't cover much skin either," said Gabe, "but it'll answer. Suppose we get started."

"It's still raw," objected Meg in distaste.

"They'll cure into a perfect fit."

"Won't they shrink?"

"Sure, sure." Gabe began to hack out roughly the three sets of shorts. "But if we use thongs to lace them up the side, they can be adjusted."

Wotten stood around on first one foot, then the other. He looked so helpless, Gabe sent him off to the cavern to dig for more flints.

"It's easier than chipping them out ourselves," he said to Meg.

A shadow fell across Gabe's shoulder. With newly aroused wariness, he jerked around. Two of the submen were watching them hungrily.

"Nothing like a little fresh meat to improve your social standing."

The most difficult task, Gabe soon found, proved to be making thongs. Meg punched holes with a thorn, laced them together. A scrap of pelt had been left over from which she contrived a bra of sorts. She donned the outfit triumphantly, turned around like a mannequin.

"They're plenty brief," Gabe remarked.

Meg said: "They feel kind of clammy." She looked up, startled. "Good heavens, we've got a gallery."

Gabe realized eight or ten of the aboriginies had clustered about them curiously.

"Shoo!" he said. They backed off, but not very far.

"Here comes Dr. Wotten," said Meg.

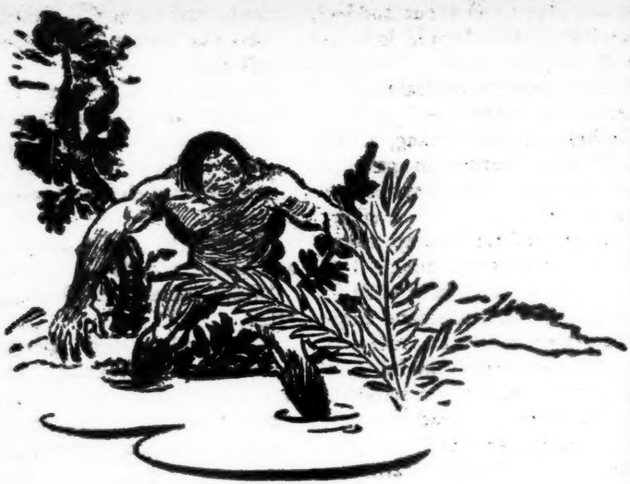
Gabe noticed that the doctor's leaves were sadly awry, but there was a triumphant grin on his pale sharp features. He exhibited a small collection of flint knives and scrapers.

"No arrow points," he said. "Obviously, they hadn't discovered the bow. There's some evidence of other cultures too. The cavern seems to have been used at widely separated intervals by different peoples." He discovered that Gabe and Meg were clad in the pony's hide, raised his eyebrows. "Neat fit. If it wasn't for the fur, I'd think it was your own skin."

"Here's yours." Meg handed him a pair of shorts.

"Anything for the sake of convention." Wotten grimaced, climbed into them. He looked suddenly distressed. "They feel like a cold wet eel!"

Gabe was studying the flints. "We haven't much to go by, Oliver, but it strikes me that the island might be a natural incubator for man." He indicated the submen grouped about them. "I wonder if these primates are an early species of homo sapiens



or merely a collateral branch like the Heidelberg man?"

"There's a superficial resemblance," agreed Wotten. "You're the biologist, Meg. What do you think?"

"I could tell more about it, if I could examine their teeth." She made a face. "I'd as soon stick my head in a lion's mouth."

"But what's become of the other peoples?" insisted Wotten.

"Crossed to the mainland," suggested Gabe. "Perhaps the Venusian myths have a basis in fact. The most primitive tribes inhabit the northwest shore of the swamp. From there on they fan out in a gradually ascending scale of culture."

"Nonsense, snorted Wotten. "There's a thousand kilometers of swamp between us and the mainland. A few individuals might make their way across, but not entire tribes. Food's plentiful. Why should they have left anyway?"

"Pressure from other groups, possibly."

"From what other groups?"

"I don't know yet. But these aren't the aborigines Harriman saw, not according to his description. We haven't glimpsed but a small portion of the island. From the copter it appeared to stretch for several hundred kilometers to the northwest—"

Gabe heard the apes bark excitedly, then scatter for the cavern like a flight of starlings. He paused, said, "Now what do you suppose got into them?"

Shorty tugged at Gabe's arm, chattering excitedly.

"Something's alarmed them."

Meg's freckles stood out suddenly across her nose. "Could it be the tiger?"

"I don't know," said Gabe. "We'd better follow them."

He heard a nasal twang, a thud. Dr. Wotten grunted in pain, sat down abruptly. Gabe's eyes started from his head.

A three-feathered shaft protruded from the doctor's shoulder!

"Down!" Gabe cried and jerked the girl's legs out from under her. Meg sat down with a thump. There was another twang and a second arrow whispered overhead.

"Get behind the tree!"

He seized Wotten's arm and dragged him to cover.

Meg rolled beside them, dirty, disheveled.

Gabe peered warily down the canyon from whence the arrows had come. There was still no evidence of the bowmen.

"How are you, Oliver?"

"Conscious," Wotten gasped painfully. "It's high, all the way through my left shoulder."

"Should I try to take out the arrow?" asked Meg in a faint voice.

"No. He might bleed to death."

Wotten groaned, gritted his teeth. Hundreds of gnatlike insects were converging around Gabe's head. He began to feel thirsty. He detected movement among a clump of palm trees fifty meters down the canyon.

"Ah," he said, "here they come!"

Three men emerged from the palms. They were tall, almost seven feet, and except for breech clouts and sandals, naked. They moved up the canyon leisurely, bows half lifted.

"They act as if they expect to flush us like a covey of birds," muttered Gabe.

The doctor tried to slew around, groaned again, relaxed limply.

The bowmen began to close in on their position. Their expressions were as passionless as death masks. Gabe could read neither triumph nor expectation in their white, hawklike visages. He felt as if he were being hunted by wooden Indians.

"What do they look like, Gabe?" Wotten's eyes were glassy.

"Large craniums, black hair, white skin. Must be over two meters tall. They're the fellows Harriman saw, all right. I wonder—"

Before either Meg or the doctor could protest, Gabe stood up. He held his hands over his head in the universal gesture of peace, walked slowly toward the bowmen.

The hunters paused, raised their bows. They called back and forth to each other with high whistling notes like the twittering of birds. They betrayed neither surprise nor fear. Curiosity, Gabe could read in their faces, and caution, neither of which could be construed as an emotion. It was uncanny.

Hands upraised, he waited for what seemed an eternity while the bowmen consulted among themselves. His mouth was dry, his palms damp with sweat. Then they approached without relaxing their vigilance, chirped questioningly at Gabe.

He let his breath escape in a sigh, shook his head.

The bowmen indicated by gestures that Gabe and his companions were to accompany them.

He shook his head again, pointed to the arrow transfixing Wotten's shoulder. He tried to convey by pantomime that they couldn't desert their wounded comrade.

One of the bowmen nodded. He raised his bow, drew the feathered shaft to his ear, aiming at the doctor's neck. His attitude was that of a man about to destroy a horse with a broken leg.

Meg gasped. Wotten looked suddenly sick with fright.

Quick as a striking snake, Gabe's hand shot out. He seized the center of the arrow, wrenched it from the bow, snapped it in two.

He saw the other two savages spring back a step, cover him with their weapons, but they didn't release the arrows. Their hawklike features were inscrutable. Their action, Gabe sensed, was protective. There was no feeling involved, merely the dictate of a keen passionless intelligence.

Weak from the shock of the narrowly averted disaster, he turned back to Wotten, examined his wound. The barbed flint head protruded almost two inches from Wotten's back. Blood had oozed from around the shaft, clotted.

He said: "Whenever you read about these things in the old romances, someone has a shirt to tear up. Hang on, Oliver. I'm going to break off the feathered end of the shaft."

A groan was wrenched from the doctor's lips as Gabe snapped it in two. He seized the barbed flint point, drew the arrow on through the wound. Wotten's eyelids fluttered. His face went pale as milk, but he didn't faint. Blood, bright red, oozed sluggishly from the hole.

"Don't move. You might start a hemorrhage."

"I couldn't," Wotten essayed a sickly grin. "I'm too feeble."

The bowmen, Gabe realized, had unslung their stone axes. They hacked down two saplings, trimmed off the branches. From a shrub that grew in profusion among the heavier timber, they split strings of bark, laced them weblike between the poles. In an amazingly short time, they'd constructed a crude stretcher. His estimate of their intelligence rocketed upward.

Gabe scooped up a handful of clay, plastered it thick over the wound.

"That should stop any bleeding. While we get to their village, we might be able to obtain boiled water, bandages. Those breech clouts of theirs aren't hide; they're cloth."

Two of the bowmen deposited Wotten on the stretcher. Carrying it between them they started down the canyon. The third motioned Gabe and the girl to precede him.

"Come along," Gabe said dryly. "We seem to be invited."

Emerging from the box canyon into the main gorge, the bowmen turned upstream, deeper into the hills. The walls towered higher and higher overhead. Mosses, lichens, and ferns sprouted from crevices. The floor of the canyon was a mass of jumbled stone and vegetation through which the stream dashed musically.

"These rocks are torturing my feet!" Meg limped gingerly after the stretcher. "Dr. Wotten looks feverish, doesn't he?"

Gabe caught up with the bearers. Wotten lay on his side, eyes closed. Two fever spots glowed like rouge in his pale cheeks. He was muttering half deliriously.

"How do you feel, Oliver?"

"Water."

The bearers set him down to rest, and Gabe brought him water in his cupped hands, let it trickle down his throat. He bathed the doctor's face, said grimly to Meg: "He ought to be in a hospital. If gangrene sets in, he's a goner."

"Can't we do something?"

He shook his head.

The bowmen took up the litter again, started upstream. Their guard prodded them after it.

"Even when we get to the village," Gabe shook his head; "we can't do much but help nature a little."

Meg, limping beside him, said: "I don't see how our ancestors survived long enough for me to be born—or why!"

"They were tough," Gabe replied. "Even as late as the twentieth century they had to get along with drugs like penicillin. They lived in gloomy houses of wood and stone, swathed themselves in layers of cloth. Apparently, they thrived in conditions that would kill a modern man!"

Twice more the bowmen rested. Each time Gabe bathed the doctor's face. Wotten was tossing fitfully, breaking out from time to time in a flood of talk.

"Delirious," Gabe pronounced. He and Meg were stumbling one on each side of the stretcher. "How much longer is this march going to last?"

"I think we're here!" Meg replied in astonishment.

Gabe lifted his eyes. His mouth dropped. He felt overwhelmed.

A tremendous cliff with sheer walls like fractured ice towered impressively overhead. During past geologic ages, slices of stone as big as houses had peeled from the cliff, forming a gigantic shallow cavern like a bandshell.

The cave thus formed, Gabe estimated in wonder, must extend a hundred meters across at the base; two hundred meters from the talus at the foot of the cliff to the crown of the arch. Row after row of squat stone houses rose up the shallow back wall in ledges.

"The Arizona cliff ruins," exclaimed Meg in awe.

"Only these aren't ruins," Gabe pointed out dryly. "And they aren't in Arizona." They were proceeding up a narrow trail which ascended the talus. Gabe recognized three Venusian hyenas nosing in the offal at the base of the cliff. They were as large as ponies with pointed yellow ears, hideous blunt fanged snouts. They slung into the underbrush at their approach.

Rough steps, he saw, had been chipped from the face of the cliff leading to the ledges above. The ledges swarmed with naked children.

"Prolific," said Gabe. "It's a miracle they don't all tumble off, though. That must be a twenty-meter drop from the lowest tier to the ground."

Meg bit her lip. "What do you think they'll do with us?"

He shook his head, following the stretcher up the steps. The tribesmen were emerging from their pueblolike dwellings, peering over at them curiously. The women were almost as tall as the men. Instead of the breech clout they wore short sarongs. Their hair was black, piled up on top of their heads and beaten silver rings dangled from their ears. The air was full of their whistling birdlike chatter.

"They seem curious," Gabe mused with a frown, "and interested. But they don't show any more excitement than puppets. I haven't seen one laugh, frown, anything yet. It's uncanny."

"Look out!" Meg cried in sudden alarm.

Gabe jerked his head up. Horrified, he saw a woman plunge from the ledge above him accompanied by a shower of rocks. She had been leaning out watching them, he realized in a flash. The lip of the cliff had given away beneath her weight. The woman's body described a short parabola, struck the ledge almost at his feet, glanced off into space. He heard it land on the talus at the foot of the cliff twenty meters below. There was a rattle of stones dwindling into silence.

Meg had her hands over her eyes.

White, shaken, Gabe looked at the villagers. To his horror, they were paying no more attention to the tragedy than if it hadn't occurred. Their twittering conversation arose about him unchanged. It was impossible that the woman could have survived the fall, but none of the bowmen showed enough curiosity to descend the cliff to see.

He realized suddenly what drew the hyenas.

"Good heaven!" he breathed, "what manner of creatures are these?"

Before Gabe or Meg had a chance to recover from their shock, they were hustled across the ledge, shoved unceremoniously into a small square chamber. A fire burned on the floor, sending a lazy spiral of smoke through a hole in the roof. A naked crone hunkered by the fire. She glanced up, exchanged a brief chirping with the bowmen, who laid the stretcher on the floor and departed.

Meg shivered against Gabe. "She looks like a witch!"

There was a window facing the ledge as well as the open door, but very little light entered. The room smelled musty. The crone ignored them, busied herself putting water on to boil. She bent over Wotten, cleaned the clay from his chest and back.

"What's she doing?" whispered Meg.

Gabe frowned. "I think she's

going to dress the wound."

"Should we let her?"

"She's doing as well as we could."

She was cleansing the wound, Gabe saw, with the boiled water. He raised his eyebrows. Where had the bowmen learned to purify water by boiling it? She was using no superstitious hokum either but went about her task with the matter-of-fact efficiency of a trained nurse.

She prepared a poultice of wet leaves, bound it in place with strips of tapelike cloth. Then she poured a black evil smelling brew from a clay jug into a gourd, held up the doctor's head, allowed the contents to trickle down his throat.

Wotten choked, arched his back spasmodically.

"She's poisoning him!" Meg burst out.

"Nonsense." Gabe gripped her arm. "That's probably a sleeping potion. I've never seen, never heard of a more efficient treatment of wounds among savages. Did you realize it was distinguished by the absence of any incantations or primitive superstition?"

The woman beckoned them, indicated that they were to lift the patient to a pallet of furs in one corner. They did so as gently as possible. Whereupon, the crone hustled them outside on the ledge.

"I feel like I'm abandoning him," protested Meg.

"He's in good hands." Gabe's pale-blue eyes were speculative. "It's queer they should take such pains to patch Wotten up, when they're so cold-blooded about themselves. It's queer. I don't understand it at all; unless they're saving us for—" His voice trailed off.

"For what?" cried Meg, her eyes round as saucers.

He shook his head.

She stamped her foot. "Gabe, you can be absolutely the most irritating person in the System. Do you do it on purpose?"

"No. It's a natural talent," he replied dryly. He realized that the bowmen were paying no attention to them. "What now?"

His question was answered almost at once as one of the savages approached, beckoned them to follow.

They were led up a crude wooden ladder to the second tier of apartments, pushed inside a chamber similar to the one below. At first, Gabe thought it was empty.

"We seem to have been assigned quarters," he said as their escort departed. There was no door, no guard. "At least, they're trusting jailers."

Meg said: "Oh! What's that?" and clutched Gabe's arm spasmodically.

His eyes narrowed as he made out a hairy bundle curled up on the pallet of furs in the darkest corner. The beast must be as large as the hyenas he'd seen earlier. He approached the pallet, prodded it gingerly with his toe.

The bundle uncoiled like a spring, bounded upright.

Meg screamed. Gabe almost trampled her underfoot in his backward spring.

"Why, it's one of the ape men!" said Meg in a weak voice.

The primate snarled, but it was obviously as terrified as either of them. It backed into the corner, crouching on all fours.

"Ignore it," said Gabe. "It'll calm down when it sees we don't intend it any harm. I wonder what it's doing here?"

"The bowmen captured it, I suppose." Meg giggled nervously. "Maybe they're starting a zoo."

"There's something a little more sinister behind their collecting instinct, I'm afraid."

Gabe examined the chamber curiously. A huge clay jar as tall as Meg stood in one corner full of water. A second smaller jar contained grain. There was neither firewood nor weapons in evidence.

He thumped the water jar. "Look at this. Burnt clay pottery. It was built by coiling. Late Neolithic at least. Roughly speaking, it took man half a million years to reach this stage of development on Earth."

"All right," said Meg, "so we've come up in the world half a million years. I can't see that it's much improvement."

Gabe continued to rummage through the debris of the chamber. He found broken awls, discarded bone fish-hooks, a few cracked vessels.

"That's the lot." He sounded disappointed.

"What," said Meg, "no helicopter?"

The girl was keeping one eye peeled on the ape man crouching in his corner. Gabe went to the door, looked out. The stream was a ribbon of silver below. The Venusian night was emptying shadows into the narrow canyon. He was suddenly conscious of hunger, realized he hadn't eaten since morning and then only a few strips of raw Miohippus.

He turned back into the cave. "Woman," he said, "bestir yourself. Fetch the supper."

Meg curtsied. "What'll you have, my lord? Seeds and water or water and seeds?"

"It's not a balanced diet." He found the grain, put a handful in his mouth, made a face. "I suppose its nourishing anyway."

They munched the flinty kernels, washed them down with water. Gabe shoved the jar towards the ape man.

"Have some."

He was answered by a growl.

"Suspicious cuss, isn't he?" He stretched, got to his feet. "I wonder why he hasn't escaped."

"Where are you going?" said Meg in alarm as Gabe started for the door.

"To look around."

"Not and leave me cooped up with that ape."

"You're bigger than he is," said Gabe dryly, "and probably twice as mean. Anyway I'll be within calling distance. Just stick your head out the door and scream."

Out on the ledge, Gabe paused. He could hear the twittering of the bowmen's voices rising from the houses all about him, but the ledges were deserted.

It had begun to rain again, he saw, the water gushing in a curtain beyond the overhang of the cliff. He moved slowly along the narrow footpath extending between the house fronts and the chasm, peered into the doorless entrances. For the most part, they were empty. The bowmen were gathered in small clans in the larger rooms, eating, talking in their high twittering voices.

No one tried to stop him. They paid no more attention to Gabe than to a stray dog. He had a feeling that they didn't consider him human. A sub species of man, perhaps.

But the eighth chamber held a surprise. A large fire burned on a raised hearth. It was tended by two women. At first, Gabe thought he'd stumbled upon a primitive chapel. Then he saw the eggs. They were as large as his head and arranged in neat rows upon shelves about the room.

From time to time, one of the women piled wood on the fire, keeping it burning evenly with uncanny skill. The other made rounds of the chamber, turned the eggs.

An incubator!

So the bowmen were oviparous. He grimaced. An alien species. A race of man, intelligent, sensual, but devoid of emotion!

Gabe reached the ladder without being turned back, descended to the first level, looked in at Wotten. The doctor was sleeping. His fever seemed to have abated miraculously. The crone, squatting by the fire, glowered at him, but made no sound.

He wandered back out, headed with studied carelessness for the flight of steps leading to the foot of the cliff. While still a dozen meters away, a figure detached itself from a shadowy doorway, blocked his path. Gabe felt a spear nick his stomach. He sucked in his breath, drew back, turned around.

So they were prisoners! Prisoners with the freedom of the cliff village!

With darkness, he realized, the chirping of the bowmen had risen, not abated as he'd expected. He could make out figures flitting from door to door. The village had taken on the activity of a disturbed bee hive.

He began to retrace his steps cautiously, lest he miss his footing. Suddenly, above the noise of the saturnalia, he heard a scream.

Gabe's stomach contracted as if hit with a fist.

"Gabe! Gabe!" Meg's voice rang out, reaching him faintly; then she screamed again.

He threw caution to the wind, scrambled up the ladder like a monkey. There was a bitter taste in his mouth as he flung himself through the entrance to their chamber.

Half glimpsed in the shadows, he saw Meg crouching against the wall. A giant bowman towered above her.

The giant spun around.

Gabe never paused. He plunged across the chamber, dived head foremost, butting the bowman in the solar plexus like a goat. Caught flatfooted by the unorthodox attack, the giant sat down gasping for breath.

Gabe lit sprawling on hands and knees in the giant's lap. Possessed by the single urge to kill before he was killed, his hand closed about the head of the bowman's ax, yanked it free. They came to their feet together. He saw a flint knife in the giant's hamlike fist. Gabe swung the ax.

The polished stone blade caught the bowman in the center of the forehead, split his skull like an egg. He toppled to the floor, lay still.

Almost at once, the reaction set in. Gabe began to shake, the nervous chill penetrating to the marrow of his bones. He had traveled a long way down the road to savagery, he felt. Except for a few incorrigibles isolated in the penal colony on the Moon, man's urge to kill had atrophied.

Meg was huddled on the floor sobbing hysterically. He felt a peculiar tenderness for the girl possess him, and thought:

"It must be what the ancients called love. I am regressing to the primitive!"

He stooped, patted the girl on the shoulder awkwardly. "It's all right. The bowman's dead."

Meg flung her arms about his neck, sobbed damply on his shoulder. He realized how dependent the girl was on him.

Dependency! Could that account for his overwhelming mawkish emotion.

Modern women weren't dependent in any sense of the word. They had been relieved almost altogether of the burden of propagating the species. Children were reared by the state. Mating was conducted along approved biologic lines. The popularity of artificial insemination, of test tube babies, was sweeping Terra.

Marriage, as late as the twenty-first century, he thought, had been a contract in which women submitted to being the property of man because of her dependence on him. But love had declined with the passing of marriage and family.

He was acutely conscious of the touch of the girl and enjoying it hugely. The ancients, he had to admit, knew a good thing at that.

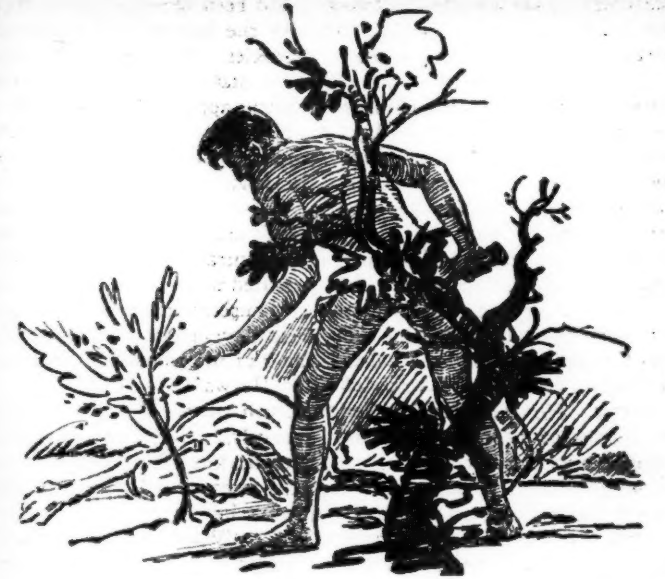
He caught sight of the ape man cowering terrified in the corner, said: "We've got to dispose of the body."

Meg clung to him convulsively, but he disengaged himself. He dragged the dead bowman out on the ledge, swung him off into space. There was a faint thud from the floor of the canyon. He listened tensely for the sound of alarm. There was none, only the snarling of hyenas as they closed about the body. By morning, there'd be nothing left but a few gnawed bones.

He shivered, strode back into the gloom of their chamber. Behind him the shrill twittering of the bowmen rose unabated from the cliff dwellings.

Dr. Wotten was propped in a sitting position when Gabe and Meg stopped in the next morning.

"Hello," he said. He was much



improved, the wound irrigating nicely. "I've been pestering my nurse half to death trying to learn their language. I can understand a few words, but I can't say them. I don't think our palates are capable of reproducing their vocal sounds."

"That's not the only distinction. They're oviparous." Gabe bluntly related his discovery of the incubator. "They're intelligent and sensual. A regular saturnália takes place after dark. But they're as devoid of emotion as rocks!"

"Hm-m-m," said the doctor.

"They're monsters!" Meg burst out.

"Meg's prejudiced," said Gabe dryly and told about killing the bowman.

Wotten looked frightened. "I don't like it."

"Also we're prisoners."

"How do you know?"

"They keep a regular watch on the stairs and it's the only route to the canyon. I tried to go down last night and again this morning. I was stopped both times."

"Shhh!" Meg interrupted in an agitated voice. "Listen!"

They all heard the hum of a helicopter outside.

Gabe sprang onto the ledge. The 'copter was quite audible as it glided past overhead, but he was unable to see it because of the bulge in the cliff. He realized in despair that neither could the rescuers spot the village. He re-entered the chamber.

"Anyway," he said dryly, "they found the island."

Wotten's recovery was miraculous. In six days—the long days of Venus—the crone ousted him from her chamber, and he took up quarters with Gabe, Meg and the ape man.

Gabe had spent the period filching equipment from their captors. He had stolen a bow and arrows, hidden them with the ax behind the water jar. He had stolen sandals for all three of them and strips of dried meat. He had stolen bundles and bundles of the fibre used by the bowmen to weave cloth.

"I missed my calling," he informed Meg. The pair sat cross-legged on the floor of their quarters plaiting the stolen fibres into a rope. "I should have been a thief."

A shadow fell across the doorway.

Gabe hastily threw the rope behind the water jar.

"Gabe!"

It was Wotten's voice. The doctor came inside, a frightened expression on his pale thin features.

He said: "I've bad news!"

Meg gulped; the doctor was so obviously terrified.

"Out with it!" snapped Gabe.

"We're going to be killed!"

"Killed?" echoed Gabe. "But what for?"

"Food!"

They sat back in stunned silence.

"But they're not cannibals!" Meg protested in horror.

"No-o," continued Wotten. "No. They're not cannibals. But neither do they consider us human." He managed a wry grin. "Their term for us isn't complimentary. 'Semi-reasoning animals'! That's as near as I can interpret it. We're considered something of a delicacy in the food line."

"Where did you learn this?" Gabe's bony features were blank, but his eyes wore a worried expression.

"They bagged twelve of the ape men this morning. Listen. You can hear them herding them along now."

In the silence that followed, Gabe detected the frightened chatter of a number of the hairy submen as they were moved along the ledge below them.

"I happened to overhear some of the bowmen talking," Dr. Wotten went on. "It seems we were being held until they'd captured enough to provide a feast. They've enough now."

"When does the feast take place?"

"Tonight."

Meg bit her lip.

Gabe said with grim humor, "There's many a slip between the hand and the mouth." But he wasn't feeling so confident. The doctor was still weak, in poor condition to attempt flight. "Oliver," he asked unexpectedly, "what are the bowmen?"

"Eh?"

"We've considered them human—If not in the direct descent of homo sapiens, at least a collateral branch. But are they?"

"They reproduce by eggs." The

doctor smoothed his beard. It was a shaggy affair now that took considerable smoothing. "So far as I've been able to learn, they have no words for love, hate, fear, any of the emotions in fact. Oddly enough, there's no symbols for chief or priest in their vocabulary either."

"A pretty good sign," said Gabe, "that they don't have any chiefs or priests. They're anarchistic. They have none of the superstitions common to primitive peoples—"

"What are you trying to do?" interrupted Meg indignantly. "Prove that it's perfectly ethical for them to eat us?"

"In a way," said Gabe. "But that's not the point. Granted that very little research has been done on Venus; still we've always found evolution producing much the same forms as Earth. There are variations of course. A greater variety of amphibious species for instance. But there's no parallel for the bowmen. Oliver, I'm worried."

"It's high time," Meg said witheringly. "Or didn't you understand? The bowmen are going to eat us. E-A-T, eat us, tonight."

"Oh that." Gabe grinned. "It's rather short notice. We'll have to wait until dark to make a break for it. It'll be a toss up whether the bowman or night arrives first."

They heard the submen's barking chatter directly outside on the ledge. The doorway darkened. A flood of hairy primates stampeded into the chamber, herded like cattle by the bowmen.

Meg suppressed a scream. Dr. Wotten looked decidedly distressed, while the submen milled around in fright.

"It's getting a little congested in here," said Gabe. He went to the door, stopped abruptly. A shadow passed across his gaunt features.

A giant bowman was standing on guard at the entrance!

Gabe came back, sat down.

"They're taking no chances," he said dryly. "They're keeping us penned up until the slaughter."

"We've one advantage," Gabe said curtly. One eye on the entrance, he was coiling the rope he and Meg had braided. Shadows were gathering in the corners of the room where the captive apes crouched in horror. The atmosphere was blue, dusky. "The bowmen never have encountered anything but these submen. They haven't much respect for our intelligence. Even less for our courage."

He reached the end of the rope, tied a slip knot, inspected the loop closely.

Meg watched him with fascinated horror. Satisfied with the knot, he gave Wotten the bow and the ax.

"Here. I can't be encumbered." He glanced out the door again. "We're in luck. It's beginning to rain."

A few fat drops were spattering down, then a curtain of water began spilling from the overhang of the cliff. It grew perceptibly darker.

"We haven't much time," said Wotten uneasily. "They may begin butchering us any minute."

"Take the food," Gabe said to

Meg. A little muscle was jumping in his lean jaw. "Can't put it off any longer." He bit his lip, crept toward the entrance.

The guard stood just outside, his back to their quarters. Gabe drifted up behind him silent as a shadow. With a quick flip, he dropped the noose over the bowman's head, yanked with all his strength.

The noose tightened, cut off any cry at its source. The bowman was snapped inside the chamber as if caught in a snare. He thrashed wildly, silently, but Gabe clung to his back like a leech. His struggles grew weaker. He went to his knees, to his face.

Gabe was breathing heavily. The muscles stood out in knots along his arms and shoulders. His pale-blue eyes were morose. Sweat trickled unheeded down his nose.

At length he relaxed the pressure. When he tried to loosen the noose, the knot was jammed. He sawed the rope through with a broken flint knife. The apes, he noticed, were huddled in abject terror against the back wall.

"Come on," he said, then added sharply: "Don't look at his face. It isn't pretty."

Once outside, Gabe led the way through thickening darkness to the ledge below. Gray shapes moved like shadows among the dwellings. The whistling conversation of the bowmen rose all about them above the sigh of rain.

"They'll be watching the steps," said Gabe. He turned in the opposite direction. His palms were sweating, the blood throbbing in his ears. Each step, he expected to be stopped, but they reached the end of the ledge without detection.

Gabe unslung the rope, forced his fingers to behave as he tied a bow line in the end. It was quite dark.

"Sit in the loop," he grunted at Meg.

She paled, but arranged the rope about herself, clipped over the ledge. He let her down the twenty meters hand over hand. The rope slackened. He felt a faint jerk, pulled it back up.

"You next," he addressed Wotten. He was breathing hard again, sweating profusely.

In a matter of moments, Wotten had been lowered beside the girl. Gabe secured the end about a projecting rock, hooked his feet in the rope, came down hand under hand.

A shrill twittering broke out suddenly overhead. Wotten's frightened voice came up to him out of the darkness.

"They've discovered our escape!"

A hairy figure plummeted down the rope, struck Gabe's shoulders, nearly dislodged him. He slid the last few feet, dropped. The apes, he realized, had followed them. They came swarming down the rope, scattered like mice into the canyon.

"Give me the bow," he said to Wotten. "We'll have to abandon the rope."

The raucous twittering of the bowmen was sweeping the cliff. In the direction of the steps, he could sense movement without seeing it.

"Run!" Gabe commanded sharply and bounded down the talus like a clumsy gazelle. Meg and the doctor on his heels.

"They'll expect us to go downstream," he panted; "back with the apes. But they're so logical they'll send parties both ways."

He turned up the canyon. They blundered ahead tripping over creepers and fallen logs. Meg sprawled in a hole, scrambled to her feet, too frightened to cry out.

"I . . . I can't keep up!" Wotten panted in distress.

Behind them the whistling calls of their pursuers sounded closer, almost on top of them.

"Quick," snapped Gabe in a low hoarse voice. He flung himself down flat against the wall of the canyon, rooting his nose in the mud. "Get down. They're used to driving the ape men ahead of them like rabbits!"

Meg and the doctor dropped beside him, lay still.

Gabe peered out from between the stems of a clump of bushes. The rain had died to an intermittent drizzle. The phosphorescent glow of fungus and lichens, moss and shrubs had intensified until he could make out the shadowy shapes of trees and rocks. He stiffened.

"Don't move!"

Gabe could distinguish dim shapes moving swiftly upstream. They were only a few, perhaps a dozen, but they were fanned out from wall to wall. They came on at a trot. The bulk of the bowmen, he realized, must have gone down stream after the ape men.

He burrowed deeper in the mud, hoped fervently that they were inconspicuous among the shrubs against the rock wall.

He didn't dare look up. A sandal-shod foot crashed through the shrubs not two feet from his eyes, splattered mud in his face. He held his breath. The bowmen trotted on.

Gabe felt Meg quiver, gripped her arm. He peered out between the shrubs again.

"Get up," he hissed in the girl's ear.

"Are you crazy? They're still in sight!"

"Get up. We're going to stay in sight behind them. They're too sane to think we'd do such a fool thing. They'll believe we're some of themselves."

He scrambled warily to his feet, hauled the protesting girl from the mud. The bowmen were dim shapes up the canyon. He found Wotten, touched his shoulder.

The doctor gave a yelp of terror, bounded upright.

"Oh!" he said; "my heart! Are they gone?"

"No." Gabe trotted after the bowmen. "Don't try to conceal yourself. And don't get too close!"

"You don't need to tell me that," said Wotten.

Too conservative of their breath to talk, they kept always just within sight of their pursuers. The canyon climbed gradually, narrowed. They were approaching the source of the stream.

All at once, the bowmen disappeared.

"Stop!"

Gabe frowned, tried to penetrate the darkness ahead. It seemed thicker, blacker. There was no glow of plants to relieve the strange absence of light which had engulfed the bowmen.

"Where did they go?" Meg asked in a frightened voice.

Gabe snapped his fingers. "The cloud blanket! We've been climbing steadily ever since we left the swamp. We're in the cloud blanket!"

Not far ahead, he heard a whistling chirp as one of the bowmen called to the others.

"Quick!" Gabe whispered. "If we get in the clouds, they'll never be able to find us."

They forged ahead, were swallowed suddenly by damp wet blackness. They held to each other's hands, moved at right angles to their former course.

Gabe kept one hand outstretched, expecting to reach the wall of the narrow ravine. But it kept receding before them. They went on and on cautiously, testing their footing lest they be hurled over a precipice.

Wotten broke the silence. "It's no use. I can't go another step." He sank to the ground.

Gabe listened. There was no sound from their pursuers. He felt suddenly as if he were alone on the roof of the world.

"We've lost the bowmen," he said dryly, "and ourselves too. There's no use going any further tonight. We'd only travel in circles if we didn't fall off a cliff."

With dawn, a gray light filtered through the steamy atmosphere. A creeping moss clothed the plateau with a sea-gray carpet. Beyond a radius of twenty meters they were confronted by gray nothingness as if they were staring over the edge of the world.

"We're in the lower level of the cloud blanket," Gabe said, giving Meg and Wotten each a small portion of meat and grain.

Wotten asked: "Which way do we go?"

"There's a faint slope to the plateau. I think we've crossed a divide. If we continue down hill, we should come out of the clouds sooner or later."

"But we'd be traveling northwest—straight away from where we crashed," Meg protested.

Gabe nodded.

"We reached the island flying almost due south from the base," he pointed out dryly. "And we crashed at its southeastern end. If we continue to follow the island northwest, we should strike the swamp a little closer to the mainland. Besides—" He paused.

"Besides what?"

He grinned, said irrelevantly, "We can't go back anyway—unless you're interested in providing protein for the bowmen. Let's get started."

The plateau fell off so gently at first that it proved almost impossible to follow the slope. But in half a kilometer it pitched sharply down hill.

"It's getting lighter!" called Meg.

Gabe grunted. He'd observed

the gradual thinning of the mist as they descended. Shrubs were replacing the creeping moss. The ground was rougher, broken by gulleys. They broke suddenly from the cloud blanket onto the rim of a bluff.

"Look!" said Gabe.

From their vantage point high up against the leaden cloud ceiling they could see the island stretching like a pointer into the northwest. It was so narrow they could identify the swamp on either hand.

"The path of migration," Gabe mused half to himself.

"Eh?" Wotten regarded him with a frown.

"I was thinking aloud. It wasn't long ago that we . . . er . . . crawled from the swamp, naked, unarmed. No better off than the submen—"

"Crawled?" Meg interrupted. "What a degrading way to put it. I didn't crawl; I floundered."

Gabe looked exasperated. "We've weapons at last, and clothes. But we're still rather primitive. Now we're being driven across the Great Swamp by the bowmen. In a way, we've paralleled the course of evolution on Venus."

"Possibly. Possibly you're right," Wotten agreed in a worried voice. "But I still don't see how the tribes could have migrated to the mainland."

They were too busy to fret much during the three days it took them to reach the northwestern point of the island. Primitive man, they learned, had led a precarious existence. When they weren't escaping the fangs or claws of some larger carnivore, they were engaged in pursuing food.

The bow proved nearly worthless in Gabe's unskilled hands, though on their last day at the island, he shot a diminutive deer by creeping almost on top of it.

"I did better when I only had a club." He contemplated the deer with disgust.

They'd reached the end of the island late the previous night, camped on a spit of land extending into the swamp. Wotten grunted. He was sawing, red-faced, at a bow and spindle contraption which he'd rigged with a loose thong and a crooked stick. Smoke trickled out of the socket. The doctor had been vainly trying to produce fire by friction for the past three days.

He emitted an explosive curse. He got to his feet, kicked the fire drill into the underbrush.

"Whoever said, 'where there's smoke there's bound to be fire', was a liar! I would have liked just one civilized meal before we jump into that." He indicated a shallow slough of stagnant water which divided the island from the swamp.

Gabe said, "We've put it off long enough," and began to gather their traps together.

"We go north from here, eh Gabe?" the doctor frowned.

"No. Northwest. The same direction the island lies."

"But that won't get us back to the base!"

"No. Not directly. When we reach the mainland we can follow the swamp around to the base."

"But why go out of our way?"

"Sometimes the longest way 'round," Gabe remarked dryly, "is the shortest way there."

Leading the way, he waded into the shallow slough. He found the footing surprisingly firm underfoot.

When they reached the muck on the other side, Meg looked forlornly back at the island.

"I'd almost rather take my chances with the bowmen."

"Come on," urged Gabe in an eager tone.

Meg looked at him exasperated. "You act like you're looking forward to this. I'm not so anxious to leave the last solid bit of dirt for a thousand kilometers." But she forged doggedly behind him. As usual Wotten brought up the rear.

They floundered through muck and ooze, skirted treacherous bogs, waded more pools of stagnant water from which grew the roots like gnarled fingers of the Venusian mangrove. Gabe began to look worried again, then he gave a shout.

They caught up, found him standing on dry land.

"It's just a splinter of land," he vouchsafed them. "But it seems to run in a northwesterly direction like the island."

Wotten looked thoughtful, but he didn't say anything.

The ridge proved to be almost a kilometer long, heavily clothed with jungle, then it dipped into the swamp. They had to cross another section of morass before they emerged once more on the ridge.

Gabe called a halt.

"Maybe I'm premature," he said, his voice jubilant, "but I think that Veiled Island isn't an island at all, but the highest remaining land of a sunken peninsula. I've suspected something of the kind since you found those flints, Oliver."

"By Jove!" exclaimed Wotten. "Why didn't I think of that?"

"You were too sure that the tribes couldn't migrate across the swamp."

"But . . . but how?" began Meg.

Gabe scratched the bristles on his lean jaw. "It struck me first that every fresh wave of migration invariably located at the northwestern boundary of the swamp. The Illawaddy are there now. They're a very primitive people, almost Eolithic. Probably the last people to have made the crossing. There didn't seem to be but one possible explanation: a land bridge of sorts connecting the island with the mainland."

Meg's eyes began to sparkle. "Venusport! I'd begun to think I'd never see it again. I'll have breakfast in bed. Iced swamp melon. Coffee. Hot coffee, think of it, and—"

"We're not there yet," Gabe pointed out dryly.

"Gabe Clyde dead? Not Gabe. You couldn't kill him with an ax, Hen."

"Nonsense," insisted the bald-headed man who sat across the light camp desk from Ferguson. They were in the office tent at the base. "If he had as many lives as a cat, he couldn't last fifty-seven days in the Great Swamp. It's impossible, man. We're wasting the Society's funds, and we've little enough as it is."

"I'll be the judge of that," snapped Ferguson irritably. He was president of the Venusian Anthropological Society, a scrawny, sandy headed man with eyes like a gimlet. As soon as Dr. Wotten, Meg Duschene and Gabriel Clyde had been reported missing, he'd flown to the base to take personal charge of the rescue operations. He fixed the bald-headed man with his gray-green eyes, said: "At least, we're getting a satisfactory map of the Great Swamp for the first time. Have you seen this?"

He handed his assistant a folded paper. The bald-headed man unfolded it, ran his eye over the contents. It was a map of the Great Swamp. It showed Veiled Island shaped roughly like a knife blade pointing to the northwest boundary of the swamp. A chain of dots connected it with the mainland.

"What does it mean?"

"The drafting department just sent it over," Ferguson began, then paused.

Excited shouts rang out from the encampment all about them. Ferguson leaped from behind the desk, darted out the opening in the tent. The bald-headed man followed at a more sedate pace.

The camp was roughly oval in shape, hacked out of the jungle. A dozen helicopters reposed at one end. At the other beyond the tents, a group of men were clustered in an excited mass.

"What's happened? What's happened?" cried Ferguson irritably, trying to peer through the crowd.

Just then it split aside to allow three half naked savages to approach. Two were heavily bearded. The third was a girl.

"Gabe!" Ferguson's eyes half started from his head. "Gabriel Clyde!" He pounded the bald-headed man suddenly on the back. "Didn't I tell you that man couldn't be killed with an ax!"

"We found the land bridge as we'd guessed," Gabe finished. "It wasn't a foot above the swamp and in places it disappeared altogether. It's like a ragged backbone between the mainland and the island." Bathed, shaved, and clad in civilized spun glass shorts, he dawdled over coffee and cigarettes in Ferguson's tent.

Aided by interpolations from Meg and the doctor, he'd related briefly but exactly what had befallen them. Ferguson had been listening spellbound.

"Yes, yes," he broke out excitedly. "But the bowmen! Oviparous, you say. How odd. If they're not the same species as man, what are they?"

"Homo superior!" said Gabe.

John Ferguson's jaw dropped. He looked to Dr. Wotten, refusing to believe his ears.

The doctor nodded in agreement. "Homo superior in a primitive stage of development. Nature has at last evolved a highly intelligent species without the handicap of emotion."

"But if you're right," protested Ferguson, recovering his breath, "and mind you, I'm not convinced by a long shot—then we're not true men at all!"

"Exactly," Gabe replied. "We're submen like Eoanthropus. It's possibly a little hard on your ego, John, but the fact remains, the bowmen are true men; we're not."

"That . . . that's preposterous."

"No," said Wotten gravely. "No. Evolution isn't a static affair, John. It didn't produce us and stop. We're not the absolute. After a million years, we're still handicapped by emotion. It was inevitable that a species would be evolved free of this impediment. I confess that I always thought it would appear as a mutation of homo sapiens. But evidently we're not even in the direct line of descent."

Ferguson looked back and forth between the two men. "You talk as if we'll become extinct as the dodo."

"Just as surely," Gabe agreed, "as the Neanderthal type or the Cro-Magnons. We're doomed, John, as a species, unless we can do something about it."

"That's the point." Wotten tugged at his beard. "Can we?"

Convinced by their sincerity in spite of himself, Ferguson asked: "But why not exterminate them?"

"I'm not sure that we can," Gabe replied. "If we didn't wipe them all out, they'd be driven into hiding in the swamp. It wouldn't be a very good foundation for tolerance once the bowmen became supreme. Besides, I suspect it would be useless anyway. Nature would evolve the bowmen all over again."

"But what are we going to do?"

"There's no rush," Gabe replied dryly. "It may be five, ten thousand years before the bowmen are a threat to the human race. Essentially, it's a task for future generations. Our job is to convince mankind of its danger. At least we're the only species who've been able to foresee their own extinction and set about circumventing it."

Meg laughed infectiously, rumpled Gabe's hair. "So we're a lower species because we love and hate. I'm glad we are. I think the bowmen are monsters." Her brown eyes twinkled at Ferguson. "It's not conventional any more, but Gabe and I have decided to get married."

"Married!"

The president of the Venusian Anthropological Society looked profoundly shocked.

"Yes," agreed Gabe. "I suppose we can dig up the antique ritual at the library. We've some doubt, though, about persuading a cleric to perform the ceremony."

Ferguson swung on Dr. Wotten. "Don't tell me you're mixed up in this too, Oliver?"

"I'm to be the best man. Carleton mentions such a functionary in his 'Sexual Life of Twentieth Century Americans'."

"You know your own minds," Ferguson said in a doubtful tone, "but it sounds indecent to me." Then he grinned suddenly, stuck out his hand. "If I remember my anthropology, Gabe, congratulations are in order."

THE END.

Hearing Aid

Hearing Aid

Originally designed to aid the human ear, radio amplifier tubes similar to the one shown on page 99 ride the nose of the Proximity Fuse as an aid to a robot.

A rudimentary brain, this Proximity Fuse. It has no independent thought, but only a single instinct; a congenital instinct. It is born dormant, and it sleeps until awakened by the shock of a heavy rifle. Upon being awakened, the robot comes alive and its single instinct is that of a paranoid introvert. It demands isolation. Its sensory channel will detect objects that breach that isolation, and the violation of its instinct sets up a single stimulus: The will to self-destruction.

If it cannot be alone, it prefers death. That it also destroys everything in its vicinity is of no interest to the rudimentary brain.

It violates two of the Three Basic Laws of robotics, since it is not self-protecting and it is not inhibited against harming human beings. And on the other hand, it is equipped with safety devices that work in its sleep to keep it from harming its master; and in its death-will, it harms only those who would do its master ill. It is a useful robot.

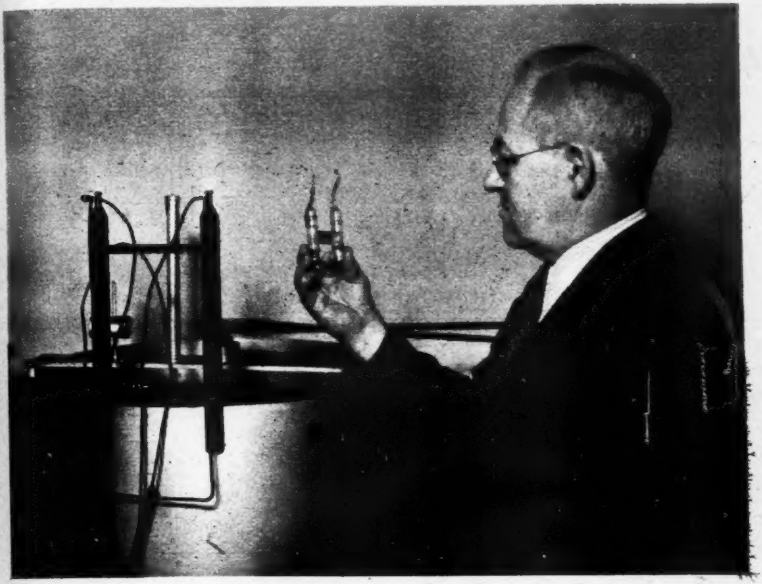
This is the American version of the kamikaze attacker—a suicidal robot that does not waste the lives we, unlike the Japanese, consider precious. It is the smallest radar machine made. It did much indeed to make it possible for the American major fleet units to invade those areas of the sea covered by Japanese air power—air power that had proven so fatal to earlier efforts to operate major naval units anywhere near land-based air power.

On land, no single weapon was so deeply loathed by the Nazi soldiers as the terrible, intelligent shells that sent steel sleet raining down into their foxholes, not merely skittering along the ground after the shell hit and exploded.

These hearing aid tubes were used in a portable, battery-operated radio set with a designed maximum life of ninety seconds.

In March, 1942, Astounding's editorial suggested a gun that "sees all, knows all, and does all—all by itself" was needed, and would be produced. It was; the radar controlled gun, firing radar-fused shells! Which went even a step beyond science-fiction—

Lorin O'Bryan, General Electric Company's "Keeper of the Volt and Ohm," holding a primary standard cell. He is beside the oil bath in which G.E. primary standard cells are kept at a constant temperature.



Electrical Yardsticks

by EARL WELCH

***Any** man who has ever done precision measurement work, and found that his two meters disagreed as to what 1.00 volts was, has met the problem. How do you know it's one volt—or one ohm—or one ampere? The care and nursing of high-precision standards is a science in itself!*

When is an "ohm" an ohm, and who says so, and why? Or just what is an "ampere," or a "volt?"

Such things seem pretty simple to most technicians. You merely put a resistor across the terminals of an ohmmeter. If the needle swings up to the numeral 1, then the resistor is an ohm. That's all there is to it—for them.

But that simple measurement on the ohmmeter is worth something only because it is the final in a long line of measurements, theorizings and headaches. Along that line some men spent, and spend, a great deal of time and patience splitting hairs and trying to keep them split to within a few thousandths of a percent, or less.

The long line reaches from the final measurement of, say, a carbon resistor in a radio experimenter's home workshop, back through the instruments made by a large electrical company, from the instruments to the standards maintained in the company's laboratories, from the company standards back to the standards maintained in the national standards laboratory, and on to standards maintained in the standards laboratories of other nations.

And there must be no slips along that line, or somebody is going to want his money back. It might be only ten cents, because a carbon resistor is a bit outside the limits of accuracy guaranteed by the manufacturer. Or it might be thousands of dollars, because instruments used by a large Power & Light Corporation have not been calibrated precisely.

If the fellow in his home workshop makes a mistake in measuring something, it is only one mistake. If the man somewhere along the middle of the line makes a mistake, it might mean hundreds of mistakes will follow. But if a fellow around the beginning of the line, back in the original standards laboratory, makes a mistake, all heaven is liable to fall.

For the men who keep the standards are, literally, the men who keep a whole, laboriously constructed system of measurements from degenerating back into original chaos.

In any field of unified endeavor there must be bases, or standards, from which to measure or judge all related phenomena. Otherwise there is only the most haphazard sort of progress, if any. This is especially so in scientific fields. Science just is not science unless it works out from exact planes of reference. No scientific law would be worth its weight in semantics unless there were some standard observations or measurements against which it could be checked again and again, with invariable results.

The great strides made during the last centuries in the electrical field, both commercially and theoretically, made it imperative to have universal, precise standardization of the fundamental electrical units—the ampere, ohm and volt. This led to the establishment of the "absolute" ampere, ohm and volt, determined by the cgs electromagnetic system of measurement. The idea of the cgs system was to make the units of electrical energy comparable to units of mechanical energy. Thus the electrical units were measured in terms of mechanical forces exerted by current carrying wires in a magnetic field.

Mr. O'Bryan, in G.E's. Constant Temperature Room, holding a primary standard ohm. The affair of plugs and dials is the precision Wheatstone-Kelvin bridge.

However, making measurements by the cgs system is very difficult. So around the beginning of the present century an International Conference was held in London, where it was decided to establish practical, physical standards to represent these fundamental electrical units. These practical standards, specified by the Conference, are known as the "international" ampere, ohm and volt.

Primary standards are ultimate. That is, they cannot, of course, be measured in terms of what they, themselves, represent. They can only be described physically and then rated at a certain value—in this case, unity. Then all other similar electrical phenomena can be compared to them and rated in multiples or submultiples of this unity.

The international ampere is equal to the unvarying electric current which, when passed through a solution of nitrate of silver in water, in accordance with certain specifications, deposits silver at the rate of 0.00111800 gram per second.

The international ohm is equal to the resistance offered to an unvarying current by a column of mercury at the temperature of melting ice, 14.4521 grams in mass, of a constant cross-sectional area, and 106.300 cm. in length.

The international volt is figured from ohm's law. It is the electrical pressure which, when applied to a resistance of one international ohm, produces a current of one international ampere.

Primary standards according to the above specifications have been set up in the Standards Bureaus of most of the major nations, including our own Bureau of Standards at Washington, D. C. All measurements of electric current voltage, resistance and power, in either A.C. or D.C. circuits, are ultimately worked-out-to from these primary standards. Every electrical measuring instrument made in this country is calibrated by reference to standards certified by the Bureau of Standards.

In actual practice, however, even these physical, primary standards are relatively difficult to work with, thus necessitating still more convenient units, or secondary standards.

Secondary standards of the international ohm, or multiples or submultiples of it, are precision made from manganin wire or strips. Carefully protected in metal shells, these secondary standard resistances have a high degree of constancy, besides being portable and otherwise convenient to work with. They have been used for many years by all the standards bureaus for practically all resistance standardizing work. They are occasionally compared to the primary mercury-ohm standard to verify or re-establish their values.

It is not easy to set up secondary standards of the international ampere. Therefore for practically all standardizing work, the silver voltmeter primary standard is not used at all. International amperes are figured from ohm's law, based on the use of secondary standards of the international ohm and volt.

Secondary voltage standards are Weston Normal Cells. These cells, whose exact international voltage has been arrived at through use of the primary resistance and ampere standards, are vastly easier to handle than the international ampere standard and, with proper care, have a very dependable e.m.f.

Such primary and secondary electrical standards, or "yardsticks," are the first step in the line of measurements previously spoken of, the line that reaches from the mercury-ohm in Washington, D.C. to the carbon resistor in the home workshop.

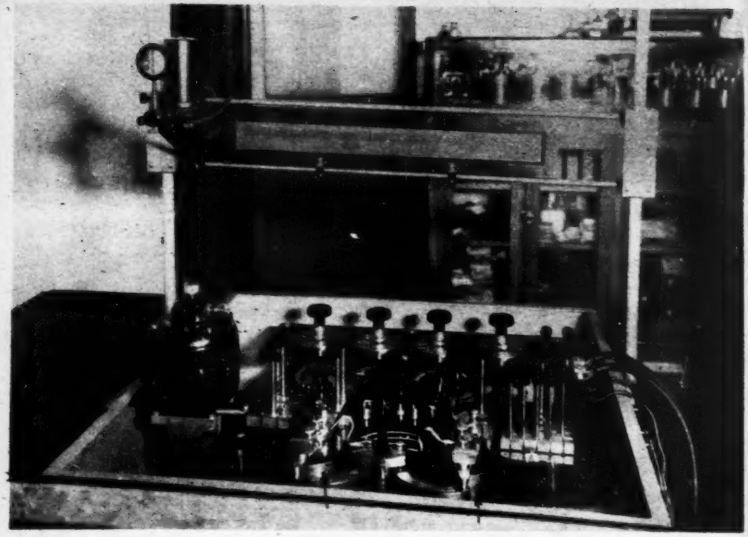
In the middle of the line are the electrical companies that manufacture instruments and other electrical apparatus. Such companies often maintain their own standards laboratories. The primary standards of such a commercial laboratory are based upon and checked against the standards of the Washington Bureau of Standards.

For example, the General Electric Company at Schenectady, New York covers some seven hundred acres with large buildings. But all the electrical measuring instruments made by the company, as well as other rated electrical products, are dependent for accuracy upon the standards maintained in a small, ten by fifteen foot room in the basement of one of these buildings. If any mistakes were made in that room, the reliability of millions of dollars worth of equipment sent throughout the world might easily be in doubt.

They call this their Constant Temperature Room, because both temperature and humidity are kept within limited bounds. There are no windows or openings where sun, wind or rain could possibly enter. The room contains not only the company's "holies of holy"—the primary standard cells and resistances, carefully protected in glass cases and thermostatically controlled oil baths—but also precision bridges and potentiometers for comparing these primary standards, both among themselves and against the secondary standards which are upstairs in the main laboratory.

This company maintains three classes of standards. There are the primary standards in the Constant Temperature Room, which physically compare with the secondary standards of the Washington Bureau of Standards. That is, they are Weston Normal Cells and manganin wire-wound resistances. These primary standards are periodically checked against the Washington standards.

Then they have secondary standards, which are the go-betweens between the primary standards and the working standards. The primary standards are used only for checking the secondary standards. The secondary standards are used only for checking the working standards. The working standards are cells, resistances and instruments that are sent around to the various other



Top view of the precision bridge. It measures to one part in a million. Two standards can be seen in the foreground, connected for measurement.

laboratories and shops for experimental and manufacturing purposes. It is against them that the final products put on the market by the company are checked.

Of all the work carried out by any company, none demands more precision and care than that centered around its standards. That is obvious, of course. For you can do work of the utmost delicacy and accuracy on an instrument or other electrical product, and have the whole thing not be worth a darn if the standards against which it was checked were not at least as precise and carefully made as it was.

You can get an idea of the care and precision that go into the making of one of the manganin, wire-wound standard resistances if you ever try to buy one. The standard itself will not look like much. You'll get a shiny metal can with a few terminals on top and a coil on the inside. But the little gadget will probably cost you from one to three hundred dollars, depending on what resistance it is and how accurate you want it.

Standard resistors are made of manganin wire, which is a copper-manganese-nickel alloy, because of all the metals experimented with over a period of many years, experiments which are still going on today, this has the most desirable properties. It is distinguished for its very small change in resistance with a change in temperature, especially within the normal room temperature range. Other advantages are that it produces only a small thermo e.m.f. when placed against copper, and its resistance remains reasonably constant with age.

For standards of 0.1 ohm or higher, the manganin wire is covered with silk and silver-soldered to its copper leads or terminals. There must be no corrosion of joints due to soldering impurities. The wire is wound on a brass form, first covered with shellacked, silk gauze. After the wire is in place, the whole thing is artificially aged by baking it for ten hours or so in an oven at a temperature of one hundred forty degrees. This takes all the stresses out of the newly wound wire, stresses which, as they eased themselves out over the months and years that followed, would greatly alter the original resistance of the coil.

For standards of less than 0.1 ohm, sheet manganin is used. It is varnished to protect it from the action of the atmosphere. The standards, when intended for the most accurate work, are designed for immersion in an oil bath, so that their temperature can be easily and precisely regulated. They are usually provided with arms for setting them into mercury cups. This makes more perfect contact, and thus less undesirable lead resistance, than the ordinary binding post connections.

A visitor entering a standards laboratory is often impressed by the fact that so great a percentage of the wire-wound standards employed, especially the primary ones, are German made. There is a tendency in the average mind to associate extreme precision work with German scientists, and this seems to be just one more case of "German superiority."

The fact is that many American companies can and do turn out standards equal to those of German manufacture. However, that was not the case some thirty to fifty years ago when the chief United States factories and laboratories were just getting under way. So they bought German precision products, and they will keep them indefinitely merely because of their age.

We said that a new standard would cost a good deal of money for such a little thing. But that "little thing," when it is twenty or thirty or more years old, and still acting nicely, is practically invaluable to the laboratory that has it. For each standard, like each individual person you meet, has a character all its own. You don't know that character when you first meet it. But from many checks over a period of many years, the engineer gets a graph that reveals it to him. From knowing how dependable it has been in the past, he can predict how dependable it will be in the future. If it has shown erratic tendencies, he will probably replace it. If it shows fine qualities, he will know he has a good, predictable standard, and it will become worth a small fortune to the company.

Great care must be taken not only in making, but in maintaining the standard resistors. Excessive humidity might cause a swelling of the insulation, thus moving the wires. A knock might also jar the wires, and anything causing a strain in the wires will cause a change in the molecular juxtaposition, which can noticeably affect the resistance of the coil when you are dealing with an accuracy of 0.002 percent or less.

When the writer of this article first went to work in a standards laboratory, he had the importance of not jarring or knocking the standards drilled into his head so thoroughly that he almost broke out in a cold sweat every time he set one down on a hard table, for fear that even that slight jar might alter the resistance 0.00000002 ohm or so, which is appreciable in a primary standard of 0.001 ohm.

When such standards are transported, for checking against standards in other laboratories, they are carefully packed in felt lined, shockproof cases. And they are usually taken by airplane, to avoid the constant bumping of other means of travel.

They must also be protected against excesses of heat or cold, both from atmospheric conditions and from overheating due to an excessive current being put through them when being used in an electrical circuit. Such changes in temperature would also cause strains in the wire, which could change the resistor's characteristics, or damage it permanently.

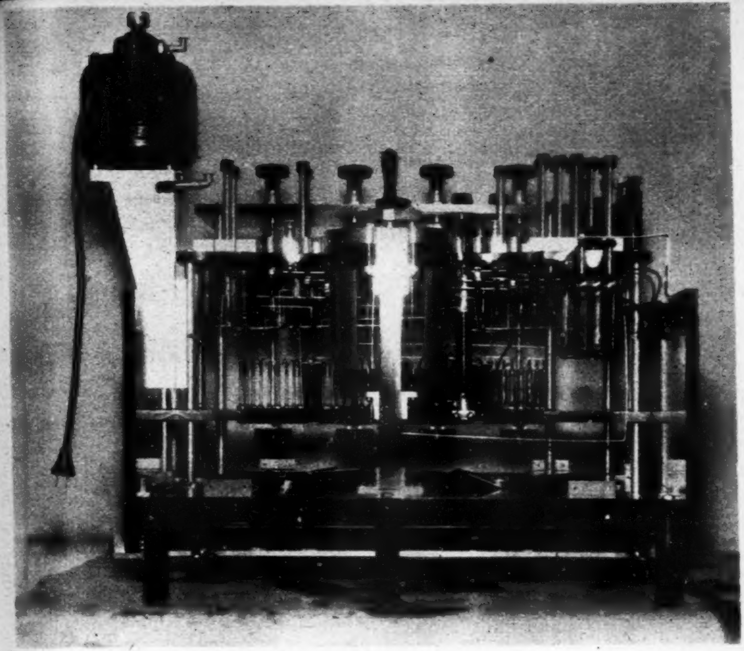
When is an "ohm" an ohm? Very rarely, as far as standards engineers are concerned.

It is a tautological fact that the mercury standard at Washington is exactly one international ohm in resistance. It was built for just that purpose—to be conventionally accepted as representative of exactly one international ohm. A wire-wound standard resistor might sometime be exactly what is engraven on its case—1 ohm, 10 ohms, or such. But it seldom is.

The standards engineer cannot pay any attention to such nominal values, except for general identification purposes. He must know exact values. And, since he often checks to one part in a million, a "one ohm resistor" would have to read 1.000000 to be exactly one ohm to him. As a change in room temperature of one or two degrees centigrade will usually change even a precision made manganin resistor several thousands of a percent, it is obvious that, for highly accurate standards work, "one ohm resistors" are seldom one ohm in resistance.

Such minute changes would mean nothing to a radio amateur who buys a resistor that is accurate only within ten per cent in the first place, and which he puts into a circuit where it gets so hot he can't touch it. But they can mean the difference between a good job and a costly blunder to the standards man.

It is practically impossible, in fact, to make a wire-wound resistor that would be perfectly constant within a few thousandths of a percent. Even if it were kept at a con-



Another view of the precision bridge, out of the oil bath this time.

stant temperature, the wire has not yet been discovered that does not change slightly in resistance with age. The changes in a well made and well cared for manganin resistor are very small, but appreciable in precision work.

But the important thing is not to know what a thing is supposed to be, but what it actually is. The standards engineer knows his resistor. Over a period of years the laboratory studies each of its standards and makes graphs showing their real values and tendencies under all normal conditions. One graph shows the resistances of a standard for all degrees of room temperature. Another shows its values through the years, indicating how much and in what direction it is changing with time.

The experimenter who has never used anything but an ohmmeter to find out if a resistor is an ohm or not would probably be rather impressed by the apparatus set up in the General Electric's "Bureau of Standards" for just that purpose.

It is a large affair of many knobs and plugs, instantly convertible into either a simple Wheatstone or a Kelvin double bridge. The whole bridge, with its many precision wound manganin coils, is immersed in an oil bath, with only the knobs and plugs sticking out. The oil is kept at a constant temperature, within plus or minus 0.005 degrees C., by a photoelectric, thermostatic control, and is constantly agitated by propellers to keep it at the same temperature throughout.

Swinging connecting blocks are provided, with mercury cups at their ends, to accommodate the mercury amalgamated arms that make current connections for all precision, standard resistors. This bridge does not read resistances directly, but compares one with another, and tells how much percent higher or lower the one is from the other. It has a precision of one part in a million for values from 0.01 to 1000 ohms. For other values in the range from 0.0001 to 100,000 ohms, it checks to ten parts in a million.

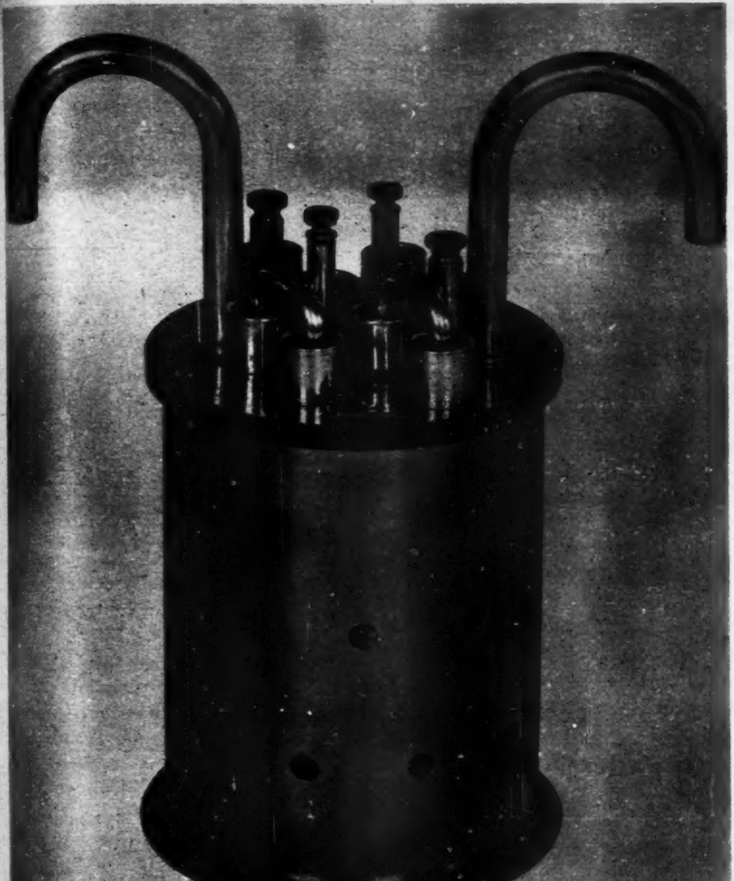
Ten parts in a million, on a 0.0001 ohm resistor, is reading to 0.000000001 ohm, which is close in any man's laboratory. The galvanometer used in conjunction with this bridge has a sensitivity of 0.0000000002 ampere per division on its scale.

When measuring such small quantities of resistance, the least bit of added resistance in your wire leads is fatal. If you are measuring a resistance of 0.0001 ohm to within 0.005 percent, your tolerance is plus or minus 0.000000005 ohm. Obviously a pair of copper leads connected in series with the resistor would ordinarily be of higher resistance than the resistor itself. Not to mention what it would do to the tolerance.

That is why, when measuring low resistances, the ordinary Wheatstone bridge circuit is untenable and the Kelvin double bridge is resorted to. The Kelvin bridge is designed to nullify the effects of the unknown and changing resistances due to connecting leads and their points of contact.

As can be seen by the diagram (Fig. 1), the only difference between the Kelvin bridge and the ordinary Wheatstone bridge lies in the addition of the resistances a and b. If they were removed and the galvanometer brought straight down to o, the circuit would be that of a Wheatstone bridge. It is just that o part of the circuit that causes trouble on low resistance measurements and makes the double bridge design necessary. The o circuit has an appreciable and changing resistance, which, when added to the resistances being compared, will cause a large error in readings.

If X and S were of the same resistance and the galvanometer were connected exactly in the center of o, then both X and S would be raised by the same percent and no error would be caused in a Wheatstone bridge circuit. If other ratios were used and S were, for example, twice the value of X, then the galvanometer would have to be connected exactly one third closer to X than to S on o in order to have the percent of added o resistance be equal for both. If that were done,



G.E's. 10:1 ratio standard, used in conjunction with the precision bridge for checking primary standards. Mercury cups and mercury amalgamated arms on top provide an easy means of changing the ratio, and at the same time insure good contact.

then the Wheatstone bridge circuit would again be all right even for low resistances.

However such a procedure is obviously impractical in practice. Not only is the resistance of o usually unknown and changing with different leads and terminal faults, but the quick use of many different ratios would entail enormous complications.

The Kelvin double bridge solves the problem of the o circuit by connecting high resistance arms in parallel with it. The galvanometer is then connected between these arms. The lead resistances are thus placed in series with high resistances, and not in series with the reference standard or resistance being measured, as in a Wheatstone bridge. If the ratio A/B is always kept equal to a/b, then the value of o will be found to have no effect on the readings.

The formula for X can be arrived at as follows:

When the bridge is in balance the galvanometer reads zero and the following conditions must therefore exist:

The currents through A and B are equal (I_1).

The currents through a and b are equal (I_2).

The currents through X and S are equal (I).

The drop from points 1-6 equals the drop from points 1-2-5.

The drop from points 6-4 equals the drop from points 5-3-4.

Therefore:

$$AI_1 = XI + aI_2 \text{ and } BI_1 = SI + bI_2$$

or

$$XI = AI_1 - aI_2 \text{ and } SI = BI_1 - bI_2$$

$$\frac{XI}{SI} = \frac{A\left(I_1 - \frac{a}{A} I_2\right)}{B\left(I_1 - \frac{b}{B} I_2\right)}$$

Since $\frac{A}{B} = \frac{a}{b}, \frac{a}{A} = \frac{b}{B}$ and we get

$$\frac{X}{S} = \frac{A}{B} \quad \text{or} \quad X = \frac{A}{B} S$$

There are two methods of balancing the Kelvin bridge. It may be balanced by adjusting the standard S, which is usually a precisely constructed manganin bar with a sliding contact and calibrated scale. Or it may be balanced by simultaneous adjustments of the ratio arms, through the use of interlocked, calibrated dial switches. The ratio A/B must always equal a/b.

For real precision work and where the ratio arms are 100 ohms or less, the four lead resistances from the drop terminals to the bridge arms must also be taken into consideration. A lead resistance of 0.015 ohm in series with a 100 ohm ratio coil would make the coil high by 0.015 percent. If the opposite dial coil were set at 100 ohms and its lead was also 0.015 ohm, then both dial and ratio coils would be high by the same percent and no error would occur. If the dial were set at 200 ohms, the lead on that side would have to be 0.030 ohm so that no error would occur. Precision bridges have special circuits for checking the balance of these drop eads and adding resistance to either arm when necessary for making them balance each other.

The standards man does not trust his bridges any more than he trusts the nominal values written on his resistors. He never uses a bridge for a simple, direct reading, as one ordinarily does with either an ohmmeter or a Wheatstone bridge.

After all, if an ohm is seldom an ohm, because the resistance of any coil changes with temperature and age, think what happens inside a bridge that has some fifty or more coils, with many soldered connections and sliding contacts, any of which might have, for precision work, appreciable variable effects on the overall resistances.

In most laboratories and shops, a bridge or other similar measuring device is the final criterion of value. It is, in fact, the standard. But in a standards laboratory the primary and secondary standards are the ultimate, true values. Every time an engineer wants to measure an unknown resistance on a bridge, no matter how good a bridge it is, he begins by finding out how far wrong the bridge is. He takes what he calls a "bridge correction."

First he uses the bridge to measure a standard resistor whose value he is sure of to within a few thousandths of one percent. By comparing the reading the bridge gives for this resistor against the true value of it, he can figure out by how much percent the bridge is reading high or low. In rare cases it might be reading flat.

Then he puts in the unknown resistor, takes down the bridge reading for it, applies the percent bridge correction, and arrives at an accurate reading of its value, eliminating bridge errors. It is more trouble than just sticking an ohmmeter across the unknown resistor and getting its value from the swing of the needle, but no ohmmeter ever read with an accuracy of 0.005 percent except by good luck.

Maintaining the standards of international voltage is as hairsplitting a business as maintaining the resistance standards. Here, too, the engineer works with one part in a million. And when you realize that mere thermo e.m.fs. from touching metal parts with your hand, or putting two different types of metal together, are usually much more than that, you appreciate some of the "gremlins" the engineer has to deal with.

Even with the best made, highly insulated precision potentiometers the engineer is usually afraid of touching the key with his bare finger, for fear of thermo e.m.fs that would throw his readings off. You'll usually find him poking at it with the eraser end of his pencil.

The international volt is fundamentally defined in terms of the international ohm and ampere. But the impracticability of setting up secondary standards of the international ampere led a group of technicians to meet at Washington in 1910 to determine the voltage of the Weston Normal Cell in terms of the

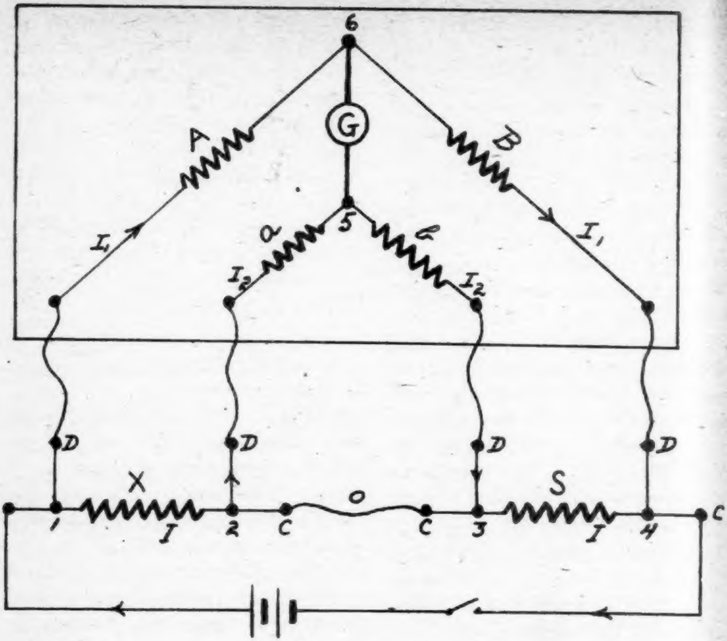


Fig. 1—The Kelvin Double Bridge Circuit.

X is the resistance being measured.
S is the standard against which it is being compared.
C & D are current and drop terminals of resistors being compared.
A & a are ratio coils.
B & b are dial coils.
o is the "inside" current lead.

international volt. This led to an international agreement, specifying the international volt to equal 10,000/10,183 of the e.m.f. of this cell at 20 degrees C.

A group of these Weston Normal Cells is maintained at the Bureau of Standards at Washington, D.C. They serve as primary standards for the determination of the international volt in this country. Some commercial laboratories throughout the country also have groups of them for their own use, which they frequently check against those at Washington.

The General Electric Company in Schenectady has two groups of them in its Constant Temperature Room. They are kept in an oil bath where the temperature is kept within 0.01 degree of 28 degrees C. One group is left in the oil bath at all times. The other is taken to Washington once a year to be compared with those at the Bureau of Standards.

The Weston Normal Cell must be treated with extreme care. It has an appreciable temperature coefficient, changing its value from forty to fifty millionths of a volt per degree change in temperature at ordinary room temperatures. It must, therefore, be maintained within very small temperature limits. And for exact work it should be kept as near as practicable to the working temperature for at least three days before electrical comparisons are made. This is because it sometimes takes that long to get back to its true e.m.f after undergoing a change in temperature.

Its e.m.f. also changes when it is agitated by carrying or otherwise moving it, and again there is a long time before the cell comes back to normal. When it is necessary to transport them, they are protected as much as possible from jarring and temperature changes.

The primary standard cell, or Western Normal Cell, is also called the "saturated cell," because the cadmium sulphate solution is saturated at ordinary temperatures. It is not adaptable to portable use. For that reason, unsaturated cadmium cells are used as secondary standards. Their e.m.f. is not as reproducible as that of the saturated cell, and they show a greater change in e.m.f. with time, but they are much more portable and not quite so critical to temperature changes. They are used in all general lab and shop work, being frequently checked against the primary cells for verification of their international voltage.

No current in excess of 0.0001 ampere can be drawn from a standard cell without an alteration of its e.m.f., enough to cause serious mistakes in precision readings. If the current is small and not drawn for long, the change will not be permanent and the cell will soon recover its original value. If too much current passes through it, it might be permanently injured. Therefore they should never be connected to a voltmeter in an attempt to measure them or calibrate the voltmeter. You would only take a chance on injuring them, and the voltmeter would not give a true reading anyway. The cells must be used only in circuits where their e.m.f. is bucked by an equal e.m.f., such as in a potentiometer circuit.

At the Bureau of Standards each cell is kept in a thick-walled copper pot, jacketed with heat-insulating material. Extreme care must be taken to keep them away from drafts and cold and the heat of lamps, steampipes, the sun, etcetera, as great errors will result when there is a difference of temperature between the two legs of the cell. Even the heat of the hand, if applied to only one leg, can so unbalance the temperature as to produce a change in the cell's e.m.f.

Standards laboratories are usually rather dark places. Even if the room has plenty of windows, the shades are seldom up. That's because the heat from the sun shining in on standard resistances, cells, bridges and potentiometers could play havor with their true readings.

The establishment of the international units was thought to have settled for good the big problem of electrical standardization. The practical units are, in fact, very useful. But they also caused a few complications which are still in the process of being ironed out.

In the first place, the international units vary from the absolute by more than was originally believed. Since there is a definite basis for the absolute units—a basis found in the more and more apparent co-ordination between electrical and mechanical phenomena—it is obvious that such a system is preferable over what amounts, in the end, to arbitrary physical standards.

Added difficulties are caused by the increasing differences found between the international units of various countries. And the "practical" standards, the mercury-ohm and silver voltmeter, were certainly never as practical as they had at first seemed.

Ohm's law can be represented as a straight line. The mercury-ohm and silver voltmeter were originally used as the two points for determining this straight line, and thus locating the international volt. However, both these primary standards were found impracticable for maintaining the units in everyday work, and the manganin ohm and Weston Normal Cell took over as secondary standards. They have, in reality, been deciding the "straight line" for many years for all practical purposes.

Such discrepancies between theory and practice, plus the troublesome correction factors the physicists must use when working in the cgs system, led the Conference of Weights and Measures to decide to abandon the mercury-ohm and silver voltmeter altogether and return to the absolute system, as soon as new determinations can be made of the electrical units in absolute terms with sufficient certainty.

Delicate experiments are being carried on toward this end. Until they are complete, the mercury-ohm and silver voltmeter will continue to be the ultimate yardsticks for electrical measurements. And the manganin coil and Weston Normal Cell will be the standards used for maintaining these international units. Even after we return to the absolute system, the manganin coil and Weston Normal Cell will undoubtedly be still used as maintenance standards, at least for a long time to come.

THE END.

"—but are we?"

(*Continued from page 6*)

nation's scientific forces could, unquestionably, develop and perfect an adequate defense against the atomic weapon—which would, incidentally and automatically, be a perfect defense against *all* weapons now known. It would have to be. It would, to stop the atomic bomb or atomic dusts, have to be able to stop every single individual projectile, even when attacking at a speed of six to ten miles per second.

One great difference between the atomic weapons and all previous weapons is in that matter of statistics. The kamikaze attacks were defeated, because the Navy knocked down ninety-eight per cent of the attackers—an overwhelming statistical victory. But with atomic weapons, only one statistic is of importance: "Did *one* get through?"

Unfortunately, there is only the remotest sort of a chance that Congress might appropriate that billion dollar fund—somewhere around the chance that a glass of water will boil when an ice cube is dropped in due to an inverted distribution of molecular motions. The general Congressional attitude is that we alone have it, we spent $2,000,000,000 getting it, the war's over, and why should we, the sole possessors, spend $1,000,000,000 more nullifying our most valuable military weapon?

The defense can be found, surely. The trouble is that the defense will never be found once atomic war starts. Ordinarily, hindsight is not very helpful, but better than nothing. This time, hindsight is apt to be impossible. Thought processes are so difficult for corpses.

The United States is world-famed for its tendency to wait around practically defenseless, and then make a wild and wonderful scramble to build highly effective defense and attack weapons.

There won't be any United States twenty-four hours after the next war starts. We'll be Target #1, because every one knows that the United States is extremely dangerous to would-be world conquerors. Particularly if she's given time to prepare.

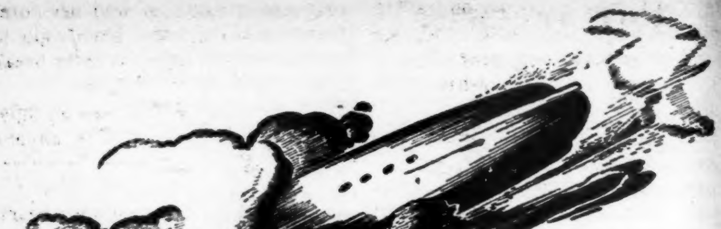
So long as the Government continues to muzzle the professional scientists who know the atomic score—to avoid frightening the people into doing something about it, perhaps—the general public and even Congress is not going to get an adequate understanding of the danger the world faces.

If the United States continues on its present "wait and see" attitude, the nation born in 1776 will cease to exist before 1966, and quite probably before 1956.

The period of the world's great danger will come when two adjoining nations, age-old rivals, start making demands backed up with atomic weapons. Czechoslovakia and Poland, for instance—and God help anyone who tries to mediate, and so gets both sides mad.

By the way, did you notice the awe-struck comments of the radio and newspapers on General Marshall's report of a forty-five thousand pound and one hundred thousand pound bomb? Of six hundred mile-an-hour bombers? The Hiroshima bomb equalled forty million pounds of TNT, and V-2 goes eighteen hundred miles an hour already.

You'd think intelligent news commentators could see that proportionality.



A Matter of Length

by ROSS ROCKLYNNE

"How long is a minute?" doesn't ordinarily make much sense—but on that strange planet, a minute was the wrong length. The oxygen in the air was the wrong length, too—but they were the right length to take the measure of Joe Henderson's deadly little problem!

Illustrated by Williams

Crowded and cramped! The little cell in the depths of the Galaxy Guard warship was neither wide enough nor long enough to accommodate two full steps of Joe Henderson's booted legs; not high enough to keep his rooster's plume of riotous mahogany hair from brushing fuel soot off the ceiling.

He hunched his blood-stained black-and-purple uniform—the uniform of the Galactic Third Pro-Hypno Army—against the confining bars, blunt-tipped fingers showing little circlets of white-against-brown where had been the flashing diamond rings his captors had stripped from him. He scowled with the full power of his glittering, agate-blue eyes. Someone, fearfully, indecisively, was coming down the ladder.

"You!" Joe Henderson called gratingly. "You with the tin earrings and upswung nose! Come here and get a good, first-hand look at a hypno, you Sensitive!"

He could see her, diminutive, beautiful and green-eyed with a hard, glassy perfection, standing in the bend of the passageway which led to the silent engine room. One small hand was to her breast, her crimson lips were parted with fear. Her nose was hidden by a tiny breathing mask, from which a hose fell away to a small oxygen tank strapped to her hips.

She spoke at last faintly. "How'd you know I was a Sensitive—with the anti-hypno barrier around your cell?"

"I know it, all right!" he boomed, transfixing her. "You Sensitives are forbidden to see, speak to, or look at a hypno. In two weeks of captivity, I haven't seen you before. And you're scared, scared silly. Captain MacDougall forbade your coming down here and you're scared of what he'll say when he finds it out."

"I'm not scared," she whispered.

"And looking at a hated swine of a hypno has turned your backbone to jelly, green eyes! Why? Why should you be scared of a hypno, when sooner or later, after you've helped the powers that be track down the last of the hypnos, you and your kind will feel the dagger of the Expurgation, too?"

She seemed to sag in the fresh blue- and green-striped glass-straw suit which touched off the eye-riveting charm of her body. She retreated a full step, and her forefinger waved quickly, from right to left, across her eyes, as if to break some spell.

His laughter at that had an ugly, snarling undertone. "The *ahypno* gesture! You ignorant Sensitive! So you still take after the old superstitions. You with your heartless training, you, the student of the thought-control schools, the neophyte on your first hypno-hunt?"

She turned slowly scarlet. She said in a muffled voice, "My grandparents taught me the *ahypno* gesture. Perhaps it'll take more than a lifetime to rid myself of it. The authorities tried to, when they discovered I was a Sensitive—but it didn't take."

His hate for her was helpless, berserk. His great hands tensed on the inner bars of the cell door, as if he might tear them from their mooring. Not much chance. Besides, what would happen if he were free of the cell, free to slap her down as he felt like doing? One more atrocity to be blamed on the hypno. *Joe Henderson, one of a race of self-styled supermen, attacks helpless girl. Beware of the hypnos! Kill the hypnos! Not until the last double-brain is dead will any of us be free!*

He breathed hard. No. Not hate. Besides, she was a Sensitive. No matter that her mind was geared to the powerful emanations which flooded from his; no matter that she had guided the Galaxy Guard warship to the third planet of the red star Antares, where he and the shattered remnants of his Pro-

Hypno division were hiding out; no matter that he alone was captured alive, the rest of his division—Ordinaries all: nonhypnos—wiped out. That she had accomplished his demise did not matter. That she was a Sensitive did; a Sensitive, gorged on brutal lies; inclosed in a cage of restrictions and commands by men who were secretly as inimical to her as they were to the hypnos, men whose advantage it was to keep the incredible truth from her.

"Come here, Miss Keithea," he said in an altered tone, yet with arrogant command. "You've seen me now, talked with me; you can't undo the damage. Besides, as you say, this cage is inclosed in the anti-hypno barrier. I couldn't get my mind through the barrier to perform the mental atrocities they accuse us double-brains of performing, could I?"

She was a swift glissade of movement. Her fear and uncertainty were sheared away by the sudden glitter of hard purpose in her eyes. She faced him through the cell.

"That's the reason I broke orders and came down here," she said huskily. "To find out if you *were* getting through. I think you are!"

The great shaggy brows over his biting, mocking eyes lifted toward his thick hairline.

She continued lowly: "We've landed."

"I know we've landed. Felt it. Where?"

"Somewhere within a few thousand light-years of Canopus."

"Lost?"

"Lost. The ship scraped the fringe of a dust cloud. It was like traveling through a tunnel of sandpaper a million miles long. Ground away our cannon controls, periscopic eyes, and the starboard repellor plates— You knew that? That we were lost?"

There was a sound deep in his throat that was difficult to interpret. "Maybe," he snapped. "After all, I killed your navigator—after he tried to kill me, of course. I guess you were bound to get lost after a scrape like that one. Now you're worried. Strange planet, maybe?"

"Strange!" Her small white fingers shook as she brought out a cigarette. She scraped the tip across her palm. The cigarette smoldered, sent up a slow spiral of smoke. She hurriedly placed it between her lips, tried to inhale. The cigarette went out. She dropped it with a little jerk.

"That's an example! No oxidation on this planet. Or very little. We can't breathe this planet's air. Torture to draw in a breath. Thirteen pounds pressure, same constituents as Earth's. But it wears you out sucking the air in and then it doesn't have much tendency to combine with the body. Just as much trouble to push it out. Norlavich says—"

"Norlavich?"

"A paying passenger we picked up on Mochus II a few days back."

Joe Henderson's eyes flickered briefly. "Stranger?"

"Stranger. He says," she rushed on, "that the oxygen isn't long enough—some such thing. He's a scientist of sorts. The rest of the planet isn't long enough either—in the time dimension. It's fairly warm, and there're flowers and trees and grass and . . . and animals. Twelve-legged animals with eight of the legs doubled up inside their fur. Everything's absolutely motionless. You can't pick the flowers or pull the petals off or bend the grass. The grass is like green wire. Try kicking the motionless animals. It's like kicking neutronium. They just stand there, with life in their eyes, but they're just statues."

She was gritting the words out. Her eyes searched his face piercingly, as if for a—clue. Joe looked back at her unblinkingly. She went on.

"We landed in the middle of a native village. We couldn't help that. The natives are giants, twelve, thirteen maybe fourteen feet tall. Two arms, two legs. *They're* motionless, too. Like rock." She blinked, shook her head. "Well, Joe Henderson, I guess I'm telling you something you already know!"

"Don't know a thing about it."

Her red-gold head of hair came up, savagely. "Don't lie," she said thickly. "It's you that did it, isn't it?"

"No,' said Joe Henderson calmly.

"You're a liar! All you hypnos are liars and child-murderers! It's a little hynotizing trick you've pulled to make us all nervous—maybe hysterical later on! Why don't you admit it?"

Her voice stayed down, but she was overwrought enough to make the *ahypno* gesture, several times, unconsciously. Joe Henderson calmly watched the flashing little finger crossing her eyes. He felt part of his mind flowing along a channel of horror—horror of the witchcraft sign she made.

"Very well, Miss Keithea. I created that planet out there—for your amusement."

She moved back, pressed rigid against the corridor wall.

"How?" she said harshly. "How can you do it through the antihypno barrier?"

"You've been answering your own questions, Miss Keithea."

She relaxed, the composed beauty of her face coming back again. "There may be only one way to find out if you're actually working on us through the barrier; kill you," she stated coldly. She turned and started back up the passageway. She slowed down, turned as slowly, stared unfocusing at a spot over his shoulder, as if not wanting, or daring, to meet his glance.

"You said that sooner or later, we—the Sensitives—would feel the dagger of the Expurgation, too. What did you mean?"

Joe's lip curled scornfully. "What I said. Let the thought curdle in your brain for awhile."

She recognized his refusal to enlarge. She said shakily, "It's a hypno lie, of course," and then she went up the ladder.

Captain MacDougall came down to the cell two hours later, after the food-beam had magically drawn away the remnants of Joe's meal. He was wearing the pure-white uniform of the Galaxy Guard, the blazing jeweled star, symbol of his anti-hypno oath showing predominantly on his sleeve. He moved up the companionway toward Joe, and Joe looked at him incredulously for a second. He was walking as if forcing his way through something that was far thicker than air. It was hardly perceptible, that slowing down of motion, and yet—

MacDougall stood in front of the cell, his polished fish-eyes, set in the round red frame of his face, fixed on Joe Henderson.

"I was talking with our Sensitive, Keithea Drummond, Joe. Seems to think you're responsible for our present troubles. A pack of nonsense, of course, but I came down to check up."

His red cheeks puffed out. Nobody ever hesitated to call a hypno by a companionable first name. Joe said nothing, and MacDougall, with a heavy, puffing sound—he was round and short and overfed—stepped out of sight for a moment, and audibly jerked open the casing to the anti-hypno barrier meter. "Nonsense" he repeated, coming back and glaring at Joe's scornful aloofness. "Barrier's full on. You couldn't get through. Stuff and nonsense about that planet coming from you. These neophytes at the game can make themselves believe anything."

"Well then," said the giant in the blood-stained uniform "that's that."

"I'm not so sure it is, Joe." The bulging, glistening eyes blinked, swept him up and down like a brush. "You sick? You're twitching."

Joe was not sick. The blood on his uniform was that of the navigator when they had trapped Joe in the cave. Joe had literally torn him apart and flung him over the cliff. The rock somebody had dropped from higher up had landed with thudding impact on Joe's head of untamed mahogany hair, but all it did was to make him groggy enough for capture. He was not sick, and he certainly was not twitching.

"Never felt better in my life."

"That's fine, Joe. Joe, we may have to kill you."

"That," said Joe, "is nothing new. You've already murdered nearly a billion of us. What's one more?"

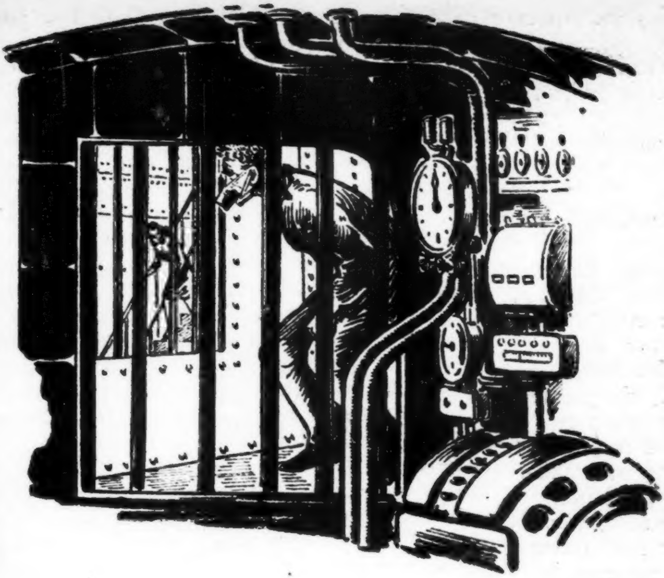
"Murdered?" MacDougall smiled. He pointed out, "Killing something we don't consider human isn't murder. And even at that, murdering a group of people who have menaced civilization for as many hundreds of years as you hypnos have couldn't be a crime by any stretch of the imagination. Try to be fair with your outlook, Joe."

Joe ignored that demand. "You're sure we've menaced civilization?"

"Documentary evidence."

"Maybe," Joe suggested, "the documentary evidence is a pack of self-perpetuating lies perpetrated by self-perpetuating religions, rackets, and Humanity First organizations for the sole purpose of furthering their own ends?"

MacDougall tossed his head with



nervous impatience. "Ten years ago the hypnos started the Second Galactic War, didn't they?" he charged.

"That's what the Ordinaries say," said Joe calmly.

"I never saw any evidence of you hypnos getting killed in that war," MacDougall said thickly. His face was darkening.

Joe said, "Self-perpetuating lie."

"Don't throw your lying hypno talk at me, you double-brain," MacDougall shouted, lurching forward and grabbing the outer bars of the cell door. "You and your kind have been digging your roots into humanity, sucking our life away. Why . . . why, it was a hypno killed my youngest daughter!"

Joe was apparently casual. But as always, when facing these appalling accusations, the unmoved brownness of his face was no indication of the sickness in his stomach. The doctor who had tended MacDougall's daughter had, after the girl had fallen into a fatal coma, been discovered to be a hypno. The hypno medico had died by mob rule. That had been many years ago, shortly before the Galaxy-wide Expurgation got into full swing.

Joe's great chest slowly rose and fell. Long ago he had learned the depthless futility of this argument

—a feud that was as elemental as white and black. He watched MacDougall's figure through lidded eyes. All this while, something strange about MacDougall had been impressing itself on his senses. MacDougall's voice, which hovered near a falsetto, had dropped several notes toward the masculine scale; and the words were drawled, had a tendency to blur into one another. The blinking of his eyes or otherwise rapid motions of his body were now of seconds' duration. MacDougall seemed to be slowing down—

And he had stated that Joe was—twitching.

Joe released his breath, taking his glance from MacDougall's glare. "Never mind *that* argument, captain. Purely as an academic question, instead of killing me to find out, why not leave the planet and keep on going back to Earth? Just because you're lost?"

MacDougall released his grip on the bars with such a slow motion that it was as if he were pulling his hands away from an adhesive surface. He said coldly, "No. If we could get up in space again, we could keep on going and get ourselves lined up with some familiar landmarks."

"Why not simply weld some spare repellor plates on?"

"Can't. The welding torches use oxygen, and we've pumped all the ship oxygen into these small tanks we have to carry around in order to breath. So we have to use the planet's oxygen to combine with the acetylene. Only it won't combine."

"Oxygen isn't . . . ah . . . long enough?" Joe questioned.

MacDougall started, turned pale. His nostrils dilated, and though he had lived with himself too long to be caught making the *ahypno* gesture for a moment it seemed his finger started to raise to his eyes.

"How did you learn that?" he snapped harshly. "Come to think of it who told you we were lost or that the repellor plates were sheared away? All the men have been outside the ship." He gasped then, in comprehension. He exploded, ripping out curses. "The Sensitive Keithea Drummond was talking to you!"

Joe admitted that she had.

"What did you tell her?" MacDougall demanded.

Joe smiled mirthfully, quizzically. "What *would* I tell her, captain?"

"I wonder," snarled MacDougall. He looked with baffled eyes at Joe, and Joe shrugged his shoulders uncaringly.

MacDougall slowly wiped his sweating face. He projected a rigid finger at Joe. "Don't forget, Joe. If you're causing that . . . that planet up there, better turn it off! I'm warning you!"

MacDougall turned, started back up the companionway toward the ladder. Joe quickly pressed himself against the bars, following him with his eyes. His breath caught. It was as if MacDougall were moving through deep water, raising a foot, leaning forward against the weight of the water, then slowly putting the foot down—as if gravity, certainly near an Earth normal, had given up part of its strength.

The sound of MacDougall's footsteps were like low drawling booming sounds, to Joe's ears. He wondered if MacDougall was aware of that.

* * *

MacDougall wasn't aware, for with much heaving and normal puffing he walked up the ladder, helping himself by the hand rails on the side. On the upper deck aft of the main air lock, he saw Keithea Drummond running toward him, her face anxious. She caught his arm, and panted,

"It's true, captain. Norlavich says the beasts are moving."

"Moving!"

"Yes. Not very much. Maybe an arm has raised an inch, or a leg—or an eye is a little bit further on in a blink. And I tried picking a flower and this time I could actually bend the stem."

MacDougall urged himself toward the lighted space of the air lock, breathing audibly. The girl walked briskly beside him, and he said glaring.

"I thought your orders were to stay away from the hypno, Keithea?"

She did not face him, stared straight ahead. "He didn't hurt me any," she said huskily. She dropped to the ground, stepping on grass that gave slowly, like a mass of wire.

MacDougall's fleshy hand wrapped around her arm. "What did the hypno tell you?"

She broke away, her face whitening to a sick color. "Nothing," she stammered. "Only that . . . that after all the hypnos are killed off they'll start on us Sensitives."

MacDougall started almost imperceptibly. Then he swore under his breath. He put anger in his eyes. "Understand what I told you now?" he demanded. "It's dangerous for you to be around a hypno. You Sensitives— Can't you see he's actually got you believing that?"

"Yes," she whispered.

"Now," he said darkly, "the Council will have to put you through another semester at the Clinic. But don't worry about it now."

They walked down the well-defined central path of the village, now and then forgetting to breathe through the nose-masks, using their mouths instead. The air, which at first had given them such trouble, went into their lungs slowly, with difficulty, but not with as much difficulty as before. Still, it was necessary to breathe oxygen from their hip tanks. That oxygen, for some reason, was normal.

They walked past several of the queerly spiraling huts, and Keithea Drummond shivered slightly as she looked into the dark interior and saw a statuesque giantess sitting in quiet, godly poise. A few feet away from the hut, a giant who in all probability was her mate, stood with his shaggy head turned up toward a sky wrecked by dark cumulus heaps, unmoving. As if he were gauging the weather.

There were other huts. There were bones strewn around—bones which several of the crew had lifted and displaced only with effort. Over some of these bones, or crunching them lifelessly in their teeth, stood *outre,* fanged creatures with round bodies and extra legs, not in use, doubled up under their fur. A domestic animal. Other giants stood about. At the far end of the village, in the middle of which the spaceship had come to a forced landing, was a brutal-faced giant coming with one foot raised eternally in the air, a bloody spear in one hand, and over his shoulder slung a limp rag of flesh—an aboriginal being of short stature with a more human look on his face than the giant who had slain him.

Keithea and MacDougall stopped beside Norlavich, the thin nervous passenger whom they'd picked up on Mochus II. Norlavich held a tape measure, was standing under the bent arm of a rock-skinned, silent, motionless giant.

"You can see for yourself," said Norlavich, quickly putting his foot on one end of the tape measure and extending the other end to the unbudging giant hand. "In four hours his hand has moved up an inch . . . whoa! Inch and a quarter. Hm-m-m! Moved a quarter of an inch in the last fifteen minutes. MacDougall," he laughed, licking nervously at his hair-line mustache, "this world is softening up."

Both Keithea and MacDougall showed questions in their eyes.

Norlavich explained pulling his business suit coat tighter around his neck, in unconscious protest against the planet's chill: "It's this way, I'm sure. This planet pulsates—in the time dimension. It's on a return pulsation at the present, as near as I can gather."

"What would cause that?" asked MacDougall, somewhat aghast. He was trusting Norlavich, a complete stranger, who was paying a fee considerably above the current rate for passage from Mochus II to Earth, only because his navigator had been killed by the hypno. MacDougall was, unbeknownst to anybody else, pocketing the difference in fare.

Norlavich squinted along an upward slant toward the masses of pendant moveless clouds. He was a small man with quiet, olive eyes that were bright and quick and as full of humor as his generous mouth. He was a college professor—so he had told MacDougall—and MacDougall, truth to tell, did not care to dip into the statement with too many questions. He was well aware, and only a trifle uneasy, that the large passage fee was in the nature of a bribe. Norlavich said he had to get to Earth in a hurry, and MacDougall's warship had been the first vehicle to put in at Mochus II for several days.

"Too bad we can't see the sun," Norlavich said. "My guess is it's a big sun, quite outside normal experience. This planet is rolling around just outside Roche's Limit, maybe within a million miles of its parent. That means it's caught in a big gravitational warp. Its year can't amount to more than a few days. At perigee, the time-dimension shrivels down to nothing. Everything, even the pull of gravity, is pretty short. As it goes toward apogee, things get longer. Good enough?"

"Shorter? Longer?" MacDougall gazed at Norlavich with intensity. "Maybe I don't understand those terms."

Norlavich laughed, his eyes looking downward four inches to Keithea's. "I'm taller than Miss Drummond—spatially. But we're both the same height temporally. Her minute is one of my minutes. If a minute were a box, we'd both fit into it snugly and neither of us would take up more room than the other. But if I suddenly became as short in the time-dimension as this giant here, I'd be a thousand times shorter temporally than Miss Keithea. Time can be considered a dimension, of course. Temporally speaking, we simply can't begin to get into the giant's box. We're too long. But as the time-dimension lengthens, as the planet travels toward apogee, the box grows bigger. And probably, according to my measurements, the box is growing bigger on the square.

"Of course," he added hastily, "don't take my word for it. There may be another, more precise explanation."

"And pretty soon," MacDougall suggested, "we'll be able to jump into their box?"

"Or," laughed Norlavich, "they into ours!"

Keithea Drummond fitted her nose-piece more tightly to her flushed face. "What about my theory concerning the hypno?"

"Well," said Norlavich guardedly, "that's something else."

She extended a small white determined forefinger. "The hypno told me he created this planet," she got out, with difficulty.

Norlavich showed his surprise that she had spoken with the hypno, then quickly took all expression from his face.

MacDougall puffed his cheeks impatiently, looking at Norlavich as if to draw his support. But Norlavich said curtly "Might be! Except that I never heard of a hypno practicing mass hypnosis on a scale like this before. It would involve making us believe the shipwreck, our getting lost, the landing on this planet, our walking around on it, theorizing—"

"Not necessarily! He may merely have created this life here, under these conditions. What if these beasts came to life and attacked us and killed us?"

"You think an imaginary beast could do that?"

"Why not? We think they're here. Hypnos are capable of anything."

Norlavich's quiet eyes sparked, lidded. He regarded her patronizingly. "Young lady, perhaps you're too susceptible to the stories they tell about hypnos."

He bared his white teeth in a smile to offset the terrific sarcasm weighting his words. Both Keithea and MacDougall wore shocked, incredulous expressions.

"That's not a smart thing to say," MacDougall glared. "Maybe you've

lived on the outer fringe of the Galaxy too long to understand how that statement sounds. Like a Pro-hypno."

Norlavich remained coldly silent. He was not willing to retract the statement, and a hard tension stretched between them. Then there was a short tooting whistle from the long slim blackened shape of the ship a hundred feet distant. By common consent, they turned toward the ship for the second meal of the day.

Several men shinnied down from the ship, hanging their welders over projections. MacDougall caught one of the men by the arm questioning him.

The man's welder's headpiece was thrown back from his face. "It's going better," he admitted. "The bead's beginning to take. I thought we might have to start using our own oxygen, but for some reason the planet's oxygen is . . . uh . . . softening up. We've got a 2700° flame, which is fair enough. Maybe we'll finish the job up in five or six hours."

As soon as Norlavich was settled into place at the head of the table with the girl Sensitive and MacDougall, he remarked, "That ties in. Oxygen's getting as long as our acetylene. Which means also the giants will start coming up to our size, too."

McDougall reached for the salt. He nodded. "We better get a good check on just how fast their time is speeding up. Maybe we better get at that in the next hour or so."

Keithea Drummond ate that meal in silence, and not much of it at that. She was a Sensitive, and she had been schooled through life to keep her thoughts and emotions to herself under strict control; her whole purpose in life was to sense the presence of hypnos, within radii that amounted to interstellar distances. But now there was a minute tremor running through her whole body.

Norlavich's all-encompassing glance noticed that. She had spoken to and seen her first hypno. He thought he had a general idea of what Joe Henderson had told her.

Norlavich finished his meal quickly, excused himself. He went to the washroom, turning his head birdlike from side to side. Except for the mess hall, the ship was deserted. He came from the washroom a few moments later, again looked around, then melted down the starboard companionway, soundlessly.

On the third deck down he followed a corridor to its termination and came to the hypno's cell, looking into its partial darkness.

"Joe Henderson," he whispered.

He strained his eyes. At the top crest of an inhalation, he caught his breath. No sound, no movement. There was nobody in the cell.

"Joe Henderson!" Norlavich called harshly.

Tiny hairs rose on his scalp. He stood perfectly motionless, staring at a fixed spot in the cell, not even breathing. And for a fractional instant, looking back at him, he saw a blurred figure, like the shadowy ghost of a man who was trying to materialize himself. That shadowy ghost was Joe Henderson. Then he disappeared completely.

Norlavich cursed. His thin fingers dived into his coat pocket, brought out a tiny, metallic instrument, dark-blue with strength and hardness. He inserted it into the lock, strained mightily, and something snapped. The door creaked a little, then sagged open of its own weight. Norlavich entered the cell.

He sweated. Then he started feeling around the cell, arms widespread, legs forked. In that manner he examined the volume of the cell, cubic inch by cubic inch. He felt a terrific, supernatural fright. He quickly left the cell, leaving the door ajar, and went up the stairs.

He had no sooner reached the main deck than he knew there was something amiss. From the direction of the main air lock he heard the crackle and hiss of several therma sticks. Several of the crew ran past him with an urgency on their faces. Norlavich got to the air lock in time to see three or four men dive into the air lock. He looked over their heads, up the breadth of the village and saw a strange sight.

The village had apparently come to life. There were perhaps thirty giants in the village, a few youngsters who were man-size, and fifteen or twenty of the round, many-legged domestic scavengers. These had all changed position and were facing the ship, even the scavengers. Half of the giants were moving with slow, ponderous walking-through-molasses stride toward the ship. The others were visibly getting into motion.

About twenty feet away was Captain MacDougall, running toward the air lock as fast as the wobbling extra pounds of his short body would allow.

Fifty feet behind him, taking it easy and looking over her shoulder, came Keithea Drummond. She was unhurried, cool, doing no more than walking quickly. One of the giants was behind her a good hundred feet. The giant who had apparently just returned from a fruitful hunting trip was to her left and this one was now in the act of dropping the dead, humanlike beast draped on his shoulder.

Because everybody expected these giants to move slowly at best, the way the nearer giant got into action was terrifying. He moved forward one step slowly, another step that was twice as fast, and another step was twice as fast as that. At the same time, he drew his spear back over and above his shoulder and brought it forward. It snapped out, was in the air, and actually picked up speed as it moved.

MacDougall then reached the air lock, was helped aboard, strangling on his own breath.

"Close the air lock!" he screamed, after taking one look along his back trail.

At the same time, Norlavich let loose his breath in an astounded roar:

"Run, girl! For God's sake—*run!*"

The spear was driving straight toward her, squaring its velocity.

And the whole village partook of that same increased motion, a slow motion film which squared its speed for every passing second. The giant who had been a hundred feet behind the girl Sensitive had in a few seconds broken that distance to an eighth of itself. As if a sound track had been installed in the film, little thundering sounds sprinkled through the village, jumped up a note, two notes, at last held steady on a series of full-bodied giant roars. The round animals in the village were in full motion toward the ship, their whole bodies spiraling eerily, each on-driving leap using an alternate series of legs.

From their indeterminate mouths came a continuous sirenlike scream.

"Close the air lock!" MacDougall roared again but Norlavich yelled,

"No."

"She's only a Sensitive," MacDougall gritted, and as his men stood stupidly, he leaped toward the air lock controls.

Norlavich went after him, brought the back of his fist smashingly against the side of MacDougall's head. MacDougall reeled back, and two of his men caught him. Norlavich flung himself from the air lock, ran toward Keithea. He didn't think he could save her. She was in the path of the spear, and certainly she would receive a serious, if not fatal wound.

All this had taken scarcely more than a dozen heartbeats. Though she saw the spear's sure destination, Keithea Drummond was in the middle of a step, unable to divert the balance of her weight. The spear struck—almost.

Norlavich's teeth met in consternation. The tip of the spear made a wide, yawing motion, curving around the girl's head, lost motion, fell leadenly to the ground.

"Run!" Norlavich yelled. He caught her hand, jerked her hard. Norlavich heard the air lock whining shut, but he lifted the girl up, shoved her through the opening, saw behind him a giant hurling a boulder the size of a man's head. The boulder hit the air lock at quite normal speed, rebounded. Norlavich edged through into the ship, then, barely escaped being crushed. The door shut, and Norlavich, white with fury, whirled on MacDougall.

"You crazy fool!" he cried. "You tried to lock us out there!"

MacDougall was trembling with rage. He flung up a quivering hand. "Hold him, men. I'll teach him to hit me."

Two men grabbed Norlavich's arms, but Keithea Drummond edged her way through the press, her greenish eyes wide and unblinking with a desperate urgency. She faced MacDougall.

"Captain MacDougall, you said . . . you said I was nothing but a Sensitive. What did you mean by that? I have to know."

His face turned brutal. "As a Sensitive, Miss Drummond, you're completely washed up."

"I have to know," she whimpered, suddenly twisting her hands. "If it's what I think it is . . . if what Joe Henderson says—"

MacDougall roared, throwing his arms over his head: "Do you think I have to stand here arguing with you with a village of giants out there ready to attack us?" His shrill voice suddenly demanded of everybody at large: "Did you see the way they suddenly speeded up?"

He stopped talking and nobody else said anything. They listened. The village was a babble of excitement and menacing roars.

They heard a giant body put its shoulder against the air lock with a vibration that traveled through the ship.

Some of the men crowded to the large closed ports on either side of the air lock. From their exclamations, Norlavich, standing rigid and watchful, guessed that the village had geared itself to normal time.

But there was a flaw in this reasoning somewhere. What was normal time? It seemed to Norlavich, although the true answer was slowly gaining clarity in his mind, that the giants should have kept on speeding up. Why they should have come to an abrupt stop at the normal human rate of motion and living was a mystery.

Somebody yelled from the port, "They're bringing a battering ram from the edge of the village!"

MacDougall shouldered his way to a port, looked out, his fleshy jowls hanging. He clipped out, before stopping to think, "Gunners, man after and forward cannons!"

Somebody pointed out that the same dust storm which had sheared away some of their repellor plates had sandpapered the exterior cannon controls away too.

MacDougall paled and then yelled, "Don't stand there. You men with hand weapons get out through the sky-hatch onto the top of the ship and pepper them!"

Ten or fifteen men shifted uneasily and then left in a body. They had no sooner disappeared up the corridor than the giants outside let out a concerted series of cries. At the same moment, the air lock door shook violently, and a nut popped off its threaded bolt like a button.

Keithea Drummond stood with a sick, utterly devastated expression on her face, thinking of something that had little to do with the danger outside, Norlavich suspected. He felt a grim sorrow for her and her kind. She showed her first signs of awareness when one of the blue-shirted crew came on the double down the port corridor. His eyes were big.

"Captain MacDougall?" he said huskily.

"Well what is it"? yelled MacDougall, turning from the port.

"The hypno, sir. Joe Henderson. Somebody broke the lock to his cell from outside. He's escaped."

Keithea uttered a low cry.

MacDougall turned on her, puffed face streaming sudden sweat. "You?" he choked. "You did that?"

But already most of the men standing around were looking not at Keithea but at Norlavich. Norlavich was the stranger, completely unknown to any of them. It was well known among the men that he had offered Captain MacDougall a fantastic sum for passage to Earth—now it seemed in the nature of a bribe, since the hypno was already aboard at that time.

MacDougall's quavering hand shot out. "Search his pockets," he harshly ordered the men who held Norlavich.

Norlavich made no protest, said nothing when the small implement with which he had broken the lock was held up for all to see.

MacDougall grabbed the implement and uttered a devastated curse.

"You know what this means, Norlavich?" he said harshly.

And Norlavich drew his slight body up proudly.

"*Captain* Norlavich," he said. "Of General Hanson Hale's Third Galactic Pro-Hypno Army."

MacDougall made an enraged sound in his throat, drew his therma stick and fired point-blank at Norlavich's stomach.

Joe Henderson the hypno, was having trouble. He could hardly breathe. It was like inhaling molasses. When Norlavich showed up at his cell—a man Joe Henderson had never seen—he struggled up from a sitting position, spoke harshly. But Norlavich couldn't answer. He couldn't have heard. A thrill of fright pricked Joe's skin as he saw that the man was moving not like a deep-water man, but through something that was thicker than water. He remembered MacDougall's slowing motion as he had slogged up the passageway hours before.

Either he, Joe Henderson, was

speeding up, or they were slowing down.

It was an hour before Norlavich, with his incredibe slow-motion, broke the lock on the cell. Joe Henderson, specks before his eyes, pushed the door open—by putting his whole strength against it. He thought the air might be better out in the corridor, but it wasn't. He staggered up the corridor, but the motion made such oxygen demands on his body that he had to rest at the head of the companionway.

His only thought was for air, better air. He took no thought of the men he passed who were moving as slowly, and perhaps slower than the man who had freed him. He dropped from the air lock, sank to a sitting position, trying to rest. Resting, his body didn't need as much oxygen.

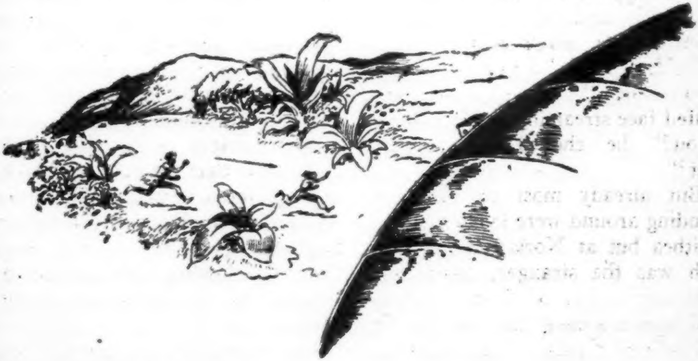
He sat there near the spaceship, only vaguely aware of the events that were flowing around him. How long he rested he didn't know. He knew only that the air wasn't much better. Finally he raised his eyes, and had his first good look.

He saw several men running soundlessly, snaillike toward the ship. Over a space of several minutes they hoisted themselves into the air lock. Behind them came MacDougall, and still farther back Keithea looking over her shoulder.

The giants of the village were moving but apparently much slower than the human beings.

Joe came to his feet, weaving, his eyes on the giant who had come back from a successful hunting trip. This giant held a spear. By the time Joe, moving with difficulty, got between Keithea and the giant, the spear was in the air.

Joe watched the spear for some five minutes. It was picking up speed, undoubtedly—probably on the principle of the square. As it came over Joe's head, he bunched his legs, leaped toward it, but fell short. He tried that several times. However, the spear was arcing down, and when its deadly barbed point was a few feet from certain collision with the girl. Sensitive, he



was able to wrap his giant hands around it.

He was breathing hard now, and it seemed as if his strength was slipping away. He gritted his teeth, grunted. The spear, hurling forward inch by inch, was simply dragging him along with it. Yet he pulled mightily, brought the spear tip around in a slow circle, his corded muscles standing out, sweating.

He saw Norlavich drop from the air lock.

He loosed his hold on the spear, dropped weakly to the ground. The spear, deprived of inertia, sank slowly downward.

Later, Joe Henderson rolled weakly out of the way of giant feet, crawled to the side of the spaceship. He watched the soundless giants bringing the battering ram, saw it strike the air lock once, twice. The third time a warp big enough to admit Joe's body was made.

As he levered himself up to the air lock, he noted men on top of the ship, slow-motion men, shooting at the monsters without much success. He saw two of the men plucked off and squashed hideously. Their mouths opened in screams, but they were sounds that belonged to another time-scale, so far below the limit of audition that they could not affect Joe's ears.

He wormed his way into the ship, through torpid, snakelike moving men, brushed past Keithea Drummond's rigid body, and saw Captain MacDougall, nostrils dilated with an anger that was completely uninhibited, holding a therma stick and pointing it at Norlavich.

MacDougall's finger was plainly contracting on the trigger. Joe was feeling an oxygen-starvation again, and he knew he'd have to sit down for awhile. His eyes fixed longingly on the oxygen tanks everybody was carrying. However, few of the people had their nose-pieces attached to their faces, and it was apparent they were breathing the planet's air. He didn't have any time for that, now, though.

One thing was apparent to Joe Henderson. The time of the human beings and the time of the giants was now identical. His own was inconceivably faster at present, so fast nobody could see him. But previously, there had been three different times: that of the human beings, that of the giants, and his own.

Sooner or later, Joe Henderson's time would level down to theirs; or level up. Which? Why Joe Henderson should keep a time that changed in relation to theirs was at first a mystery. Then he thought it out. The anti-hypno barrier. Nothing else could have kept him immune to the temporal-variation vibrations which washed this planet. His time had remained a constant while he was in the cell. When Norlavich had released him, he had become subject to the time-change, just as they had been subject to it from the first.

If he was slowing down, and that seemed likely, he had a tremendous job ahead of him, and it would have to be done in a hurry.

He now walked over to Captain MacDougall. He wrapped his great hand around the barrel of the therma stick, pulled upward. The gun was barely budging. It had a will, an inertia of its own, in another time. He sweated and he was weak anyway. Yet the gun did budge up, perhaps a quarter of an inch, and Joe relaxed dizzily as he saw a killing flash of light spear daggerlike over Norlavich's shoulder.

Joe took one of the oxygen tanks from one of the crew, but beyond the fact that it was pure oxygen, it was no better than the air he was laboriously breathing. He dropped it and turned facing MacDougall, thinking soundlessly, "Captain, you and your men are done for, unless you can beat the giants off. I can only help what's me or mine. And maybe I don't care if you die—you and your kind who hate to see the human race take one more step up along the path of evolution. But you'll never kill us all. You birds are the Ordinaries, only you don't want to be Ordinaries. When we're all dead, you think, *you'll* be the supermen."

Then he turned toward Keithea Drummond.

Norlavich had little time to consider the cause of, or feel relief for, his salvation. Suddenly he was in the air, was moving at brain-jarring speed straight through the warp in the air lock. Then, as if someone were throwing him, catching him, throwing him again, he shot dizzyingly toward the low hills bordering the village. Then he was on his feet, reeling, staggering and he fell to a sitting position, and was looking stupidly up at Joe Henderson's exhausted, streaming face.

There were hills around, dark and windy, and he was sitting on soft damp grass. Neither the village nor the ship was in sight. The transmigration had taken perhaps a minute.

Keithea Drummond was sitting near him. Her mouth opened and she emitted a soul-withering scream.

"Sit still!"

Joe Henderson rapped the words out, the savagery of his voice focusing their attention on him, rather than on puzzles which might have disastrous mental consequences.

They sat still. They sat quietly. But whereas Norlavich showed a gradual, humorous relief, fright began to distort the girl Sensitive's face.

Joe said, squatting down, "That was a drag! I could shove you along for awhile. Matter of inertia. But my time kept slowing down and you started squirming. We got this far. We'll have to make it farther back into the hills."

He spoke further, casually, obviously trying to impress subtly upon the girl the complete usualness of what had happened. "Too bad about MacDougall and the others. I think they're done for. Can't be helped. Keithea, give me a cigarette."

She handed him her half-empty pack after a long minute. She said huskily, "You *wanted* MacDougall and the others to die!"

"Did I?"

"Yes! You could have hypnotized that whole bunch of giants. For you it would have been nothing!"

Joe looked at Norlavich, and Norlavich shrugged helplessly. Joe said, very patiently, very slowly, "Keithea, you'll have to be re-educated maybe. You've heard too many lies about the hypnos. You've believed them. You'll have to start unbelieving them. In the first place, it's too exhausting to use my double-brain unless I have to. In the second place, I have a strange moral qualm against using my hypnotic powers. In the third place, I doubt if I could control more than two or three human beings at a time, hypnotically. Fourth, I have no power over animals or other intelligent beings who are not human. Good enough?"

Her teeth were chattering. "No! What are you going to do to me?"

"Do to you?" Joe laughed, blew out smoke. "Do exactly the same as I would with any pretty girl. Talk with you, joke with you, maybe try to make love to you."

"You're lying!" she cried harshly. "You'll torture me. Hypnotize me—do something horrible. You're a hypno, aren't you?"

"So are you," said Joe Henderson calmly.

She leaped to her feet, and the first normal wind she had felt on this planet whipped her hair distractedly around her face. She screamed tinnily, "Don't say that!"

"Might as well admit it, Keithea. You're a hybrid hypno. All the Sensitives are hybrids. The powers-that-be know that. That's the reason they segregate you and your kind. They train you to hunt us down—you're sensitive to us, and we're sensitive to you. But they don't ever let a hypno see you face to face. The hypno might tell you the truth. Well, now you know the truth. Ask Norlavich. He's an Ordinary — pro-hypno; but he knows what you don't."

She looked wildly at Norlavich and Norlavich nodded in complete agreement. Her head dropped, she locked her arms around her stomach as if feeling a terrific coldness there, and fell moveless to the ground.

Several minutes later, the men had her wrapped in their shirts and coats, and Norlavich said, "She'll be all right."

He gripped Joe Henderson's hand, and the two men smiled. Norlavich introduced himself as a captain in the Special Intelligence of General Hanson Hale's Third Galactic Pro-Hypno Army. "Should be some of the ships of the Galactic Third in this neck of the woods, Joe. Hale won the last engagement. Maybe if this girl throws in her lot with us, your combined minds can make a dent in the ether and get a message through."

"And we might draw a Galaxy Guard ship."

"That's a chance we have to take, I'd say. Of course, the Galactic Third has cleared out most of the Guard from this neighborhood. Even at that, you and I, fighting for a cause we know is right—well, Joe, you and I have been taking chances all our life."

They sat there, shivering and smoking.

"And when they do get here, we'll be statues relative to them," Joe said at last. "That's all to the good though. Means we won't be marooned here more than four or five hours, maybe. Maybe."

Norlavich nodded carelessly. After awhile, he mused. "Funny how egocentric people can be. We all thought our time was 'normal', whereas it was the planet's time-scale we were slowing down to. On the inverse square. The longer we stayed, the more quickly we adapted. And you kept moving at Earth-normal. The anti-hypno barrier? Hm-m-m. Preserved Earth-normal time, I'd say. No wonder I couldn't see you when I broke the cell lock."

The girl stirred moaning as if in a mental torture chamber. Joe moved concernedly closer as her eyes opened. She met his dark eyes for a long searching moment. Then she dropped her head back, sighing.

"What fools some people can be," she muttered. "I'm not afraid of you any more, Joe."

"I'm glad of that," Joe Henderson said softly. "We can't tell how long we'll be here. In the meantime, we'll have to find ourselves a cave, and get ourselves set up on a paying basis. There're giants to lick, Keithea and I don't mean only the ones on this planet."

THE END.

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The Plants

by

MURRAY LEINSTER

***It should** be axiomatic that the dominant life-form on any planet is a dangerous, powerful species—or it wouldn't be dominant. But of course, no one will be much bothered by a pretty little flower, even if it is dominant—*

Illustrated by Raymond

The plants on Aiolo grew by thousands and millions and hundreds of millions over the wide flat plains of the planet. It was not a very luring planet, perhaps, but the plants knew no other and they were content. They were all alike. Every one was a flower with a singularly complicated center and a wide collar of white petals. It grew four feet high upon a reedy, seemingly flimsy stalk. Up at the top, just under the blossom, there was a furry thickening of the stalk for about six inches. This thick part was asymmetric, with lumps here and there as if the organism within it were far from simple. It was. The plants spent most of the daylight hours gazing at Aiolo's tiny, blue-white sun. Now and then, though, they turned from it to regard each other or any singular occurrence that might take place. But there were not often any occurrences because there was nothing on Aiolo but the plants. Literally nothing. No animals. No birds. No insects. And the plants were all alike. They were not only the dominant species on Aiolo, they were its flora and fauna and everything else.

But one day there came a screaming, far away in Aiolo's thin air, and out of the purplish sky a dark object came hurtling horribly. For a time it traveled almost parallel to the ground, but gradually it descended, struck and bounced upward like a skipped stone, struck and bounced again, and then struck a third time and ploughed a monstrous furrow in the soft earth for a quarter of a mile before it stopped. It killed thousands of the plants of Aiolo in its plunging.

After it was still for a long time, four men came staggering out of gaping rents in its plating and gazed dazedly about them. And all the plants within view turned their faces to regard them curiously.

Hours after their landing, the four men built a campfire in the great furrow dug by the *Copernicus'* shattered hull. They brought out shattered burnable litter from the ship's interior to use for fuel, because, of course, the plants would not burn. As they cooked, the sun sank abruptly and the formerly faintly-visible stars came out with astonishing brilliance. The only light anywhere on the ground was that of the campfire. The flames licked high and burned with more than ordinary brightness. The atmosphere of Aiolo was only five percent nitrogen, and despite its thinness men could breathe without air tanks, and fire could burn.

The men moved about the fire with stiff and painful motions as if badly bruised and shaken. Around them the round flower faces turned toward the flames or the men or both. They made an effect of innumerable marveling listeners. The men had found their stalks too tough to be readily brushed aside, and they camped in the cleared furrow for convenience.

"After thinkin' it over," said one of the men ironically, "an' even allowin' for the fact that we're still alive, I still say we're in a fix! Slade musta been crazy!"

A second man—Caxton—said meditatively:

"No-o-o, Burton. He planned it too carefully. Some of his explosives must have been set before we left port. And he pushed off in the lifeboat before they went off. They were exactly calculated to wreck the *Copernicus* from stem to stern. He had some scheme in mind, but just what—"

"It was just murder!" said Burton stubbornly. "He was a killin' lunatic. There were forty-eight men in the ship, countin' him. Forty-three of 'em died right off. We shoulda died, too. He just meant to kill everybody. What'd he gain by wreckin' the old ship fifty light-years from anywhere?"

A third man, Palmer, said heavily:

"There's twelve million stellars worth of iridium on board. If he figured he could get away with that somehow— He might figure on coming back to loot it. He'd have the *Copernicus'* course and speed."

"Yeah?" said Burton scornfully. "How'd he reach any place to come back from? All he had was a lifeboat! An' what'd the ship's course an' speed be by the time he did get back?"

Caxton nodded.

"I agree on that, Burton. If you don't find a wreck pretty quick you don't find it. But still I think Slade had some scheme in mind. He wasn't just a maniac killing people. A maniac likes to see people die, and he left hours ahead of time."

They ate as they talked, but the food was not really cooked. The boiling point of water in the thin air of Aiolo was well below two hundred and twelve Fahrenheit. The food was hardly more than well-warmed, save where it was burnt. The coffee could be drunk straight from the boiling pot without scorching one's tongue.

Presently they fell silent gazing into the fire. Their situation was completely without hope of betterment. The hull and drive of the *Copernicus* was shattered far past patching. The ship's fuel was gone to the last ounce. The wrecking of the ship in midspace had been a triumph of ingenuity and skill. At one instant the freighter had been droning along comfortably at cruising speed on overdrive, taking a direct line between Algol IV and the Briariades. And then, without warning, there was one shattering explosion, then two more, and then a monstrous blast which seemed like the end of all things. Within seconds the *Copernicus* changed from a well-found, space-worthy vessel to a riddled, airless, powerless hunk, it's overdrive off, and therefore next to no forward velocity.

The four men beside the campfire on Aiolo were the only survivors beside the man who had set off the blasts by machinery. They had happened to be off watch in the only two compartments of the ship which were neither cracked open by the explosions nor emptied of air by the jamming of self-sealing doors. Their situation had seemed hopeless then.

Even now it was hardly better, though something like a miracle was responsible for their being still alive. No possible astrogator could have calculated a landing such as they had made, nor could any wreck have grounded approximately in one piece on any planet less featureless than Aiolo. The derelict had hit the atmosphere traveling west to east at the flattest of conceivable angles. Morever, it had overtaken the planet in its orbit so that both orbital speed and the speed of rotation could be subtracted from the relative motion of hulk and planet. It had hit within an impossibly small margin of the incredible, at a rate which would allow the atmosphere to slow it without burning it up, and at an angle which allowed it to reach ground like a skipping stone. It bounced twice, ploughed a huge ditch in soft earth, and came to rest.

But the four men who still survived the shaking-up were in no enviable position, at that. They were marooned on Aiolo, which had been visited by men exactly once before in all galactic history. They had no hope whatever of ever leaving it. And their situation was the work of a shipmate who had caused it and then set out, seemingly, to travel fifty light-years in a lifeboat powered for seven.

The night grew chill, even beside the fire. It would be horribly cold presently. Horribly! But in the bright starlight the plants stayed erect and the flowers open, their round faces staring at the fire and the men.

"We might as well turn in," said Caxton presently. "We'll think of something we can do, sooner or later."

The statement was a lie. There was nothing to think of but endless chilly days and endless frigid nights to come, on a planet on which every square mile seemed to be exactly like every other square mile. They would live here, and grow old, and die. Perhaps in a thousand or a million years another cosmographic expedition would land on Ajolo and find the rusted wreckage of their ship. But that was all they could look forward to.

They had sleeping bags ready. They crawled into them and zipped the flaps shut. The fire died down and died down—

Starlight shone on the broken hulk, and on the four sleeping bags, and on the plants. The flowers stirred subtly. They made tiny, quite imperceptible sounds. Presently those nearest the gouged-out furrow leaned toward the sleeping men. They drooped far over. They drooped in tiny jerkings, not at all like the smooth movement of muscle, but they moved. Three of the four men were far beyond their reach, though the nearest flowers strained toward them, but Caxton had happened to sleep with his head quite near to undisturbed ground. Hannet was fairly close to some flower stalks, and one leaned far over and out to approach him, but it could not. Half a dozen or more, however, could hover over Caxton. Their blooms bent down and bent down until they almost touched the cloth of the sleeping bag above his head.

Beyond that, nothing happened at all. When dawn broke and the men waked, the flowers were all erect again.

But, next morning, as the castaways prepared their necessarily half-cooked breakfast, Caxton said suddenly:

"Look here! Slade left the *Copernicus* with fuel for at most seven light-years. It's fifty to the nearest inhabited solar system. We thought he was crazy! But—where are we?"

"Right here," said Palmer gloomily. "And likely to stay, too!"

"Well then—where'd Slade be if he had sense?"

"If he had sense," snapped Burton, "he wouldn't ha' wrecked the ship. But if he wanted to stay alive—"

Then Burton stopped short, his mouth open. Palmer swore suddenly. Hannet growled.

"He'd be here, too," said Burton angrily. "He'd have made for this place and landed! He's somewhere on this planet!"

Caxton nodded. His expression was queer.

"It came to me in my sleep," he said slowly. "I had odd dreams, all mixed up with these flowers. Somehow I had a feeling in my sleep that they were telling me Slade is here. But it makes sense."

He looked uneasily at the flowers, all of which seemed to regard the man and the hulk of the spaceship with a round-eyed curiosity. It was particularly odd that all of them faced the men, because some were on the north and some on the south and east and west. The ground went on to the horizon, completely flat and completely monotonous. As far as the eye could reach, there was nothing in view but these flowers. They were all the same variety. There was no grass underfoot. They were spaced without regularity, but with an amazing equality of space between them.

"Flowers told you? Huh!" snapped Burton. "But that's it, all right. He smashed up the ship and landed here and—"

Again his mouth dropped open.

"But he couldn't ha' figured the ship 'ud land here," he protested. "Nobody coulda calculated the landing we made!"

"Hardly," said Caxton. "No matter how fine his adjustments were, he couldn't time his explosions to make us crack up on Aiolo. He could know, though, that he'd make it in the lifeboat."

"But who'd want to make it here—"

Caxton looked at the flowers speculatively.

"Maybe he had friends waiting." He paused. "There's that twelve million stellars' worth of iridium in the ship, yonder."

The four men looked at one another. One of them got to his feet and swore at the aches and pains which beset him. He went into the ship while Caxton went on evenly:

"Nobody can pirate a ship in space, on overdrive. You can't find it! And nobody can be kept from going on overdrive if he's scared or suspicious. So there's never been real piracy in space. But Slade smashed the *Copernicus* close to this planet and this sun. He made the ship a hopeless wreck, and went on to join his friends. They'll have a ship, and they'll wait with detector screens out for a derelict to float past—"

Then he got up and dived into the interior of the ship. He entered through a great rent in her plating. There was one huge tear where thirty feet of her inwards were exposed to view. There were sudden, violent crashings inside the hulk.

Caxton came out again, very pale. The other man who'd been inside came out with three or four quite useless objects in his hands.

"There was a Bridewell automatic sender in action," said Caxton briefly. "That would have helped them find her! I smashed it, but probably too late."

Palmer said bitterly:

"I went lookin' for somethin' to fight with. All I could find was torches." He threw them disgustedly away. "Weldin' torches against guns!"

Hannet growled:

"We don't have to hang around to be killed, of course. They wouldn't bother to track us—but they'll know somebody lived through the crash. They'll prob'ly bake the ship just to make sure—"

The four men clenched their hands. It was bad enough to be hopelessly marooned upon a planet inhabited only by flowers with an irritating habit of always staring at one. But it was infuriating to feel sure of the near presence of a ship on which they could return to humanity, save for the slight fact that the crew of that ship would murder them on sight to prevent it. It was most enraging of all to be unarmed.

"The most we can do," said Caxton, "is to hide the iridium. It won't do much good, but at least it'll bother them."

Burton stared around the featureless plain.

"Where you goin' to hide it?" he demanded sourly. "They could track us anywhere. Turn up any dirt an' it'd show from overhead."

"We might bury it in the furrow or under the *Copernicus*" said Caxton. "They'd expect us to cart it away. So we won't."

There was a sudden wavering motion of the plants about them. The flower faces turned, in small, jerky movements. They faced to the southeast. All of them. As far as the eye could see, every flower over miles and miles of plain turned and faced in the one direction—which was not the direction of the little blue-white sun.

Then, very faintly at first, there came a roaring noise far away. It was accurately in the direction toward which all the flowers had turned. It moved swiftly along the horizon, and all the flowers turned their blossoms in tiny jerks as it moved. When the roaring noise died out again to nothingness, all the flowers over all the plain were facing to the northeast.

"That's them!" said Palmer furiously. "Let's get that stuff hidden! Not that we want it, but so they won't get it!"

But Caxton was staring at the flowers. As he looked, with many tiny jerkings the blooms which faced away from him turned about again. And again the wrecked *Copernicus* and the four men were surrounded by staring flower faces, which watched them with an air of charmed attention.

The men set savagely to work to hide the treasure, for which the *Copernicus* had been wrecked, forty-three men murdered, and they themselves hopelessly marooned upon Aiolo.

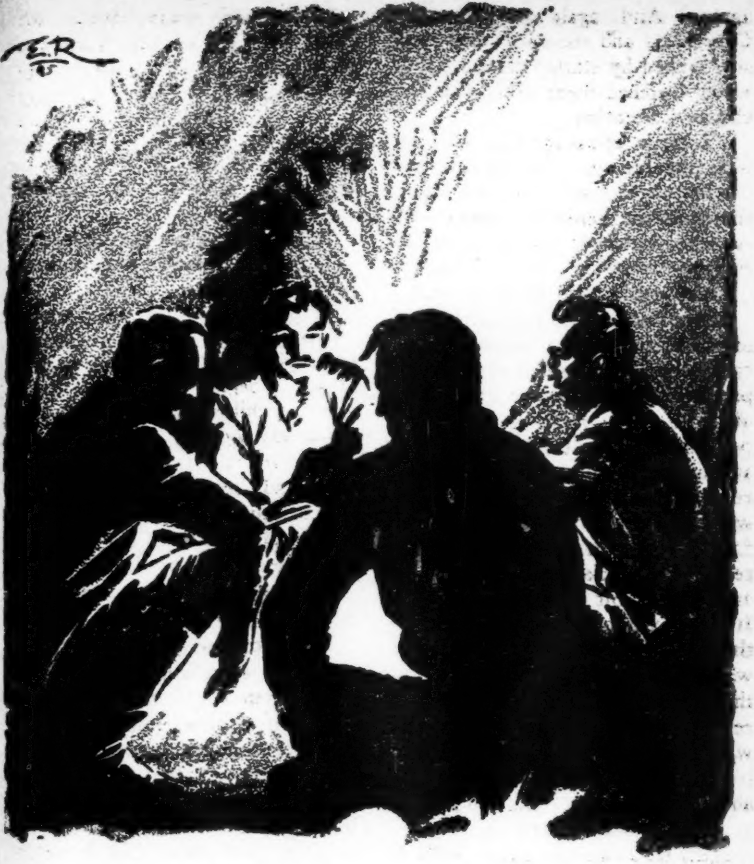
Toward sundown, Caxton had an idea. He rummaged in shattered cabins until he came upon a tiny picturescope. Men who travel far afield in space have usually some personal pictures they like to look at from time to time. Picturescopes run off such records untiringly, without power supply. Caxton found one with a seemingly full record. He tucked it under his arm and walked off among the plants. It was amazing, once he was among them, to notice that though there was no pattern in their growth—they did not grow in rows or any recognizable arrangement—there was a strict and startling equality in the amount of moist bare earth about their stalks. Each one had as much clear space as would roughly fill a two-foot square. They were not overcrowded. Each had an equal allotment of ground from which to draw its nourishment. And they had no competition. He bent down and fingered the soil. Its top was a closely-matted tissue of roots. There could be no erosion nor could there be any dust-cloud arising from wind blowing over such terrain.

He walked away from the *Copernicus*. Flower faces turned to regard him as he moved. He walked between the stalks, and every flower stared at him. There was a concerted movement to regard him. At a hundred yards from the ship, he could see that he was surrounded by staring blossoms. Even those in his rear had turned away from the ship to stare after him.

Two hundred yards away, he set up the picturescope and touched its button. It began to function. There were two children waving out of it—evidently the children of the murdered man to whom the picturescope had belonged. The scene changed, and a woman smiled and spoke. That went on for a space, and there was the interior of a living room, with the woman and the children moving about—

Caxton cast sidewise glances at the flowers about him. A few had turned from their fascinated contemplation of himself to look at the picturescope. Others turned twitchily as he watched. A blossom drooped jerkily to approach the screen. Others drooped to join it. They crowded to contemplate it. They almost jostled each other.

Caxton went back toward the wrecked ship. Three times he stopped to survey the scene behind him. The plants paid no attention to his retreat. Every one within hundreds of yards of the picturescope turned and faced it. Within ten yards, they drooped and seemed to strain toward it. Caxton reached



the great furrow, his expression very queer indeed.

"These flowers are conscious!" he said abruptly, to the others. "They've got intelligence of a sort. Look at them: looking at that picturescope!"

Burton said sourly:

"What good's that?"

There was a simultaneous movement of all the blossoms within sight. They stirred and by tiny twitching movements faced to the northwest. Unanimously. The men held their breaths. Presently the thin air brought them a faint, faint sound which was the deep-throated roar of a space drive in atmosphere. But it was very faint, and after only seconds it died away.

"They heard that before we did," said Caxton calmly, "or else they knew it—another way."

Then he looked where he'd left the picturescope. The flowers about it had straightened up and turned to face the inaudible sound. But as he watched, those about the busily working small machine turned again, and those nearest it drooped toward it until there was a small depression, about the picturescope, in the otherwise perfectly level field of flower heads.

The small white sun was very low upon the horizon. It drooped down and was not. Night fell. Hannet built up the fire with more litter from inside the *Copernicus*. Palmer began to cook.

"Slade's pals know the ship crashed, now," said Burton, seething. "They had trouble believin' it at first, maybe. Odds too big against it. But they know it now! And now they're huntin' it, cussin' because the Bridewell's stopped sendin'. They'll find us, though! They're quarterin'—"

Hannet said bitterly:

"And we haven't got a thing to fight with when they do catch up on us!"

Palmer snapped:

"You think we don't know that? Even if we go off an' hide, they'll know somebody was alive around here! So they'll bake the ship just to spoil our grub, an' there's nothin' to eat on the whole planet except what's in the ship."

Caxton said meditatively:

"I think we've got to ask for some help."

The others blinked at him. He waved his hand around, at the white-fringed flower faces now again regarding the fire and the men with an effect of captivated interest.

"These things are intelligent after a fashion. I don't know how intelligent, but—"

"Huh!" snapped Burton. "You're goin' to get a pack o' flowers to help fight off a gang of murderers?"

"I don't know," said Caxton. "But it's the only chance we've got."

Hannet grunted. Palmer said belligerently:

"What could flowers do—even if they had brains?"

He poured out barely-warm coffee and Caxton said:

"I don't know what they can do. But I can guess what they've done."

Men grunted skeptically.

"They've wiped out every other life-form on the planet," Caxton pointed out. "They haven't bothered us, to be sure, but we haven't bothered them. In landing, we killed a good many, but it was an accident. We couldn't help it. Maybe they know it. Anyhow they wiped out all competitors before us. There's no other sort of plant and there are no animals and not even an insect. You can't tell me there was never but the one line of evolution! These plants are highly organized. They're specialized! If they'd had no competition, they'd have stayed primitive. But they've developed to what they are because they did have competition which they've now wiped out! They've even arranged to divide up what's left among themselves. Every one has the same amount of space—no more, no less. They're the dominant race on this planet. They have senses—hearing, at least, and certainly sight, and I insist that I had those queer dreams of having the flowers tell me that Slade was here—and he is."

Burton snorted scornfully. The feeling of utter helplessness and hopelessness made all their tempers short. They would be found tomorrow by the ship they'd heard, which was hunting for the *Copernicus* to loot it of twelve million stellars' worth of iridium. Forty-three men had already died for that iridium. Four more would die tomorrow because, whether the pirate ship killed them in cold blood, or merely turned a heat ray on the wreck and turned all their food to charcoal, they would die. Almost any argument would be maintained to avoid thinking of their infuriating helplessness.

"How'd those flowers fight animals, if there was any?" demanded Burton.

"How did men fight them?" asked Caxton. "Was there ever any single way? Men used their brains. Man specialized on intelligence, and became dominant on Earth. These plants may have done the same thing. At least they're dominant here!"

"O.K.," said Burton in heavy sarcasm. "Talk to 'em, then. Tell 'em we'll bring 'em a load of fertilizer if they'll wipe out Slade an' his gang so we can go home in his ship!"

"That," said Caxton meditatively, "is just about what I've got to try."

"Crazy!" rasped Burton.

"Quite likely," admitted Caxton, "but I can't think of anything with sense to it that gives us a chance."

The stars on Aiolo were very bright. The air was very thin and very cold. The men in their sleeping bags lay still, and the campfire burned brightly until there were only embers left, and those embers glowed with the brightness of coals in almost pure oxygen. One by one they went out, leaving only ash. But all the men were not in the gouged-out earthen furrow behind the shattered *Copernicus*. One man lay among the flowers, twenty yards and more from the ship.

It was easy to locate him, even in the starlight, though he could not be seen among the flowers. For many feet around him, every flower stalk was bent toward him. His sleeping bag was almost hidden by hovering blossoms—most of which were clustered as close as possible to his head.

The ground was utterly flat, and it reached out to a horizon utterly without break or projection. It was a monstrous plain, completely filled with the omnipresent flowers. Nearby one could see between white-petaled blooms to reedy stalks and stringy leaves below. But at a distance the absolutely level sea of blossoms formed a sheet of snowy white.

At what would correspond to ten o'clock in the morning, the look of the vast expanse of flowers changed. From one horizon to the other, the plants stirred. They moved in tiny jerkings. They faced in one direction.

"This will be it," said Caxton evenly. "They'll find us now."

There was yet no sign of the pirate ship, neither of sight nor of sound. Three of the four men clenched their fists, raging. They might be killed. They might be mocked and left to die. They were filled with an impotent rage at their inability even to offer battle.

Caxton waited with an odd expression on his face. A dull roaring came from very far away. It grew louder. It grew thunderous. They saw the spaceship as a tiny speck of light; a moving mote of brightness which was the reflection of the sun from its chromium-bright outer plating. They regarded it in suffocating fury. It went hurtling onward—and suddenly shifted its course. Its momentum carried it on, but it swung toward the crashed *Copernicus*. It turned again. It made a wide half-circle and headed back toward the wreck and the great furrow in the earth, descending as it came. It was a small ship, much less than the freighter it had come to loot. Concealed ports opened in its bow and guns peered out.

Caxton ran back in the furrow and waved violently, trying to cause it to land where they were no plants. It ignored him. One of the bow guns flashed briefly. An acre of flowers exploded in steam, and only blackened stalks and seared earth remained behind. There was a strange, tiny, extraordinarily shrill sound which ran all over the plain of blossoms, as if the flowers themselves had uttered it in rage or horror. All the way to the horizon there was the seeming of commotion, of the agitated twitchings of reedy stalks.

The strange space vessel landed. It had the swollen, obese look of a space tug. It settled heavily upon the newly-charred ground. It was still. Then the gun muzzle swiveled. Another brief flare. Another burst of steam and thin shrill screaming noise. A path of charred emptiness opened from the space tug to the battered, broken wreck. Figures in spacesuits appeared carrying weapons. They walked negligently toward the *Copernicus.*

Caxton went to meet them. The first face he saw in a space helmet was strange to him. The second was Slade's.

"Hello, Slade," said Caxton coldly. "We figured you were responsible."

Slade grinned.

"Neat job, eh? How'd it miss you?"

"Cabin," said Caxton evenly. "Off duty. The self-sealing door worked."

"Any others?" asked Slade negligently. He raised a weapon very casually.

"Three," said Caxton. He added, "We hid the iridium."

Slade lowered the weapon.

"Yeah? What for?"

"To make a bargain," Caxton told him. "We want transportation to some place where we'll have a chance of being picked up. Promise that and we tell you where the iridium is. Otherwise—look for it!"

Slade laughed.

"We can get it outa you with a pencil beam," he said amusedly. "One thing I do wanna know, though. The flowers don't bother you. Why?"

"Why should they?"

"Maybe this's a different kind," said Slade. "Where we were waitin' for the *Copernicus* to come along, they made some kinda smell or somethin' that put a guy to sleep. That's why we got on spacesuits now. O. K.— Where're the other three?"

Silently, Burton and Palmer and Hannet came into view, their eyes sullenly defiant. Slade grinned at them.

"We came for the iridium," he said in mocking politeness. "I wanna volunteer to tell me where it is, or else the first one to take the pencil beam test. Who's gonna be nice?"

"I'll show you," said Caxton, without intonation. "It was silly to hide it, anyhow."

He led the way. He pointed to where they had dug deep under the *Copernicus'* plating to bury the precious metal for which their shipmates had died.

"Fine!" said Slade. "You men buried it. Now dig it out!"

Silently, the four men took shovels and began to dig. Slade stood over them with a blaster held negligently in his hand. Those with him explored the ship cautiously. They found no one else in hiding. They began to loot. One man carried a load of personal possessions back to the pirate ship, moving along the lane of charred, destroyed plants. Two men came back with him. More loads of loot. A shattered box of Bynarth lace had spilled half its contents in a broken-open hold. More men came from the pirate ship. The last three came without spacesuits, having been informed that since the four survivors of the wreck had had no trouble, there was no need of spacesuits here.

Caxton and his fellows unearthed the iridium. Twelve million stellars' worth. They dragged it out to the clear space of the furrow.

"Maybe I oughta make you carry it to my ship," said Slade, genially, "but a little exercise'll do my gang good. So—"

He lifted his hand weapon, grinning. It bore upon Caxton. His finger tensed on the trigger.

And that was all. He ceased to move. His eyes closed. He stood rocking on his feet, breathing heavily.

There was silence. Inside and outside the wreck there was stillness. Caxton turned his head and saw two men from the pirate ship, on their way back to it with loot taken from the *Copernicus*. They stood still swaying a little on their feet. There was no movement anywhere.

"All right," said Caxton coldly, "We'll load up the iridium. That'll be salvage, anyhow. Maybe we'll come back for the rest. Maybe not."

The four men began the transfer. When the last of the iridium was loaded, Caxton went back and took away the weapons from the seemingly paralyzed pirates.

Burton said furiously:

"Ain't you goin' to blast 'em off?"

"I promised not to," said Caxton grimly. "Besides, we couldn't. Slade had his finger tensed to kill me and he was stopped. We'd be, too."

Burton grumbled. Then he said defiantly:

"Whadda we do now, then?"

"Take off," said Caxton.

He went into the ship. Its entire company was outside. There were only the four survivors of the *Copernicus*.

The strange ship rose vertically from the ground. Caxton, in the control room, looked at the bottom visiplate. The wrecked spaceship below already grew small upon the screen, but the two blasted areas—in which thousands upon thousands of the plants of Aiolo had died—were still visible. And he saw moving dots. The men who had come to Aiolo in this ship, but now were left behind, marched somnambulistically toward the larger burned-out space in which the pirate ship had landed. But that space dwindled still more as the ship rose, until nothing could be seen at all except the illimitable expanse covered by the flowers—the plants of Aiolo.

"They're the dominant race of Aiolo," said Caxton doggedly. "It's as I told you. Like men, they specialized on intelligence. Men specialized on intelligence to tell them what to do. Men had hands to do things with. But those things were plants. They could only specialize on intelligence to tell other things what to do. To tell animals to keep away from them, for instance. They are tiny enough, and maybe the will power of a single one isn't enough to—well—hypnotize anything or anybody. But when a whole field of them concentrates on telling something or somebody what they must do—why there's not much chance of disobeying them. Animals, in the past, were useful to them. They made the animals devour other plants—made animals clear ground for them to spread to. But when they'd spread everywhere, they had no use for the animals. So—"

"Huh!" said Burton, "They didn't bother us!"

"We didn't bother them," said Caxton dryly. "And the intelligence that can force itself on other minds hasn't much trouble extracting information from them. They knew everything we thought."

"But—"

"Surely they could have killed us," said Caxton irritably. "It annoys me to think how completely we were at their mercy! But they knew—from our brains—that our arrival was an accident. They knew we were the victims of others of our own kind. And somewhere on the other side of Aiolo, Slade and his gang had made trouble for the plants. He said something about the plants giving off a smell or something that put men to sleep. That was his interpretation. Actually, he and his gang had burned off a ten-acre space simply to have room to move around in. He killed millions of the plants. They fought back the only way they could. But apparently a four-inch steel hull is a barrier to—whatever force a mind or minds can exert on others. They couldn't affect anybody inside the ship, and the more they worked on men outside the ship, the bigger the swathe of plants was burned down by the men inside the ship, to 'clear the air.' Naturally, the plants wanted to get rid of those men and of their ship, too."

"How d'you know all this?" demanded Hannet skeptically.

"The plants told me," said Caxton evenly. "Our minds are made to decide things. Their minds are made to communicate and command things. They could read our minds, but they couldn't communicate ideas—only commands—unless we were asleep, and even then only with difficulty. So I had to go out and sleep among them for them to be able to tell me. We made what you might call a bargain—while I was asleep."

"Meanin'," said Burton, "you dreamed it! Huh!"

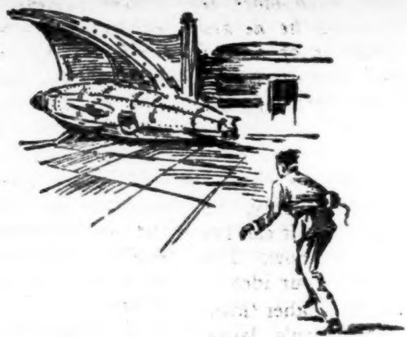
"Who's dreaming now," asked Caxton, "that we're on this ship headed for the Briariades, fifty light-years off, instead of waiting to die on Aiolo?"

There was no answer to that.

There was a blackened, empty space where a ship-mounted blaster had played, and there was a deep furrow where the *Copernicus* had ploughed horribly through soft earth as it stopped. But the blackened space was smaller than it had been. There were new small plants growing up, and tall, full-grown plants leaned strainingly far out beyond them to touch the ground at appropriate spots for yet other new plants to start. It would not be long before the naked furrow and the charred spaces would again be filled with growing plants. There was, to be sure, a curious mound at one place in that clearing—it had been men—and the wreck of the *Copernicus* would stand up above the flowers for long centuries to come. But the situation was well in hand. On the other side of the globe, too, a process of repair was in progress.

So that, with a return to normal quite definitely on the way, the flowers could spend most of their daylight hours gazing at their tiny, blue-white sun. But now and again they did turn from it to regard each other, and, of course, they would always turn to regard any singular occurrence that might take place. But there would not be many happenings, because there was—again—nothing on Aiolo but the plants.

THE END.



Fine Feathers

by GEORGE O. SMITH

It's an old, old, human urge to join the "get-rich-quick" boys. But with the educator machine that one man had invented, another man decided it was even better to join the "get-smart-quick" bandwagon. But as no man is ever quite rich enough, no man ever feels he's quite smart enough—and both lead to trouble.

Illustrated by Kramer

Ara, the crow, was aware of the fact that he was a crow. This and this alone made him different from his fellow crows. Because he recognized the fact, it made him aware of the things that separated the crows from the pheasants that abounded across the meadow—and he admired their fine plumage and elegant ways.

He began to scorn the idea of being a crow, and resented the attitude of his fellows. They were satisfied to be crows, and could not understand his resentment nor his desires, and they even scorned the idea that he was above them because he wanted to be other than a crow. In fact, they did not even understand his concept of being anything else. They did not look up to him for thinking over their heads.

He should have left them and made his way alone. But he wanted *to show them how much more he was than they, and so he decked himself in the plumage of one of the pheasants and then started to lord it over the rest of the crows. . . .*

—*ÆSOP*

Wanniston fixed the other man with a piercing gaze. "Sorry," he said. "Quite sorry. But it can not be done that way, you know. The whole proposition was your idea."

"I know," said the other man. He inspected Wanniston's large, well-proportioned frame, his strong features, and his absolute poise and wondered how any man, with all to recommend him, could be so utterly unsympathetic. The coldness in his face set him apart from one of the Galactic Ones. "The proposition was sensible enough—yet I failed. Even though I failed, my manipulations were properly done, you will agree."

Wanniston nodded.

"Where did I fail?"

"You struck a snag."

"It was not my fault."

"Are you crawling?" snapped Wanniston.

"Perhaps," said the other man bitterly. "I want to know how I failed."

Wanniston smiled deprecatorily. "Lincoln, you failed because you neglected to take everything into account. Before you succeed—before you can hope to plan without failure, you must learn to take everything into account."

"One cannot take everything into account."

"Yes, one can. It is quite possible—if you know how."

"Everything's easy," said Lincoln sourly, "once you know how."

"Certainly," laughed Wanniston.

"And because I made a mistake, I failed."

"Had you taken everything into account, you would have known that you could never succeed. You wouldn't have started, and now you wouldn't be a complete and broken failure."

"You may well gloat."

"I'm not gloating."

"I believe that," admitted Lincoln. "But that changes nothing."

"You understand our position, Lincoln. If we prevented you from trying, well, you might have succeeded, and we'd never know the benefits of your success. It was your idea, and you wanted to try. But don't feel too broken. Others have tried."

"Small consolation. Knowing that another man is starving will not put food in my *belly.*" Lincoln stood up, dusted off his jacket, and left the office.

The report of a pistol echoed and re-echoed up and down the corridor, reverberating and hushing until it could be mistaken for a wild cackle of laughter.

Wanniston went into the small office beside his own, through an interconnecting door. The key to the outer door hung in the lock by the tongue, and the office was a sharp contrast to his spotless business office. Here was no clean desk, no bookcase bulging with erudition, no deep-pile carpet. Instead, the place was a litter of complicated equipment. Not messy, in the dirty sense of the word, but the standard neglect of any laboratory. Delicate instruments stood on the floor, a box was partly filled with discarded parts, and several pieces of partly disassembled apparatus lined the walls. On the desk, which was the cleanest spot in the room, there stood a small cabinet. It was not the precisely finished cabinet that comes with commercial equipment, but strictly functional. There was no pattern to the dials—at least there had been no attempt to arrange the controls in sensible pattern. They stuck out wherever they were needed—and the sides and top each had a knob or two.

Wanniston slid the headpiece over his temples and snapped the main switch. A split-second timer kicked in for less than one-tenth of a second, waited for ten seconds, and then repeated the dose. Four times it followed the sequence of keying the machine for a period of less than a tenth of a second, following with a ten-second pause. Finally it gave Wanninston a full one-second charge and then ceased.

The financier removed the temple set and sat thinking for a moment. There was a bit of resentment at the machine—not resentment, exactly, but a slight feeling of annoyance that he must take such microscopic doses of the machine.

He knew the story of Andrew Tremaine and how the publisher's attempts to use the machine had resulted in self-destruction because it had been too good. But, smiled Wanniston, he really had no intention of trying to lift the whole race to the level of the Ambassador of the Galactic Ones, the emissary Gerd Lel Rayne. Rayne had told him.

Not the complete story, of course. Rayne could never tell that. Nor if he did, Wanniston could not have understood it. But he did know that Tremaine had developed such a machine and had energized his mind with disatrous results.

Obviously, Tremaine could not have gone on living after that. Tremaine was pretty much of an extrovert who loved people and wanted them all to advance rapidly. Wanniston was self-centered and introverted and wanted nothing more than to run the show himself. Tremaine could not live in a world alone—and with his energized brain, he was in a world alone. Gerd Lel Rayne could be his only friend, he and Gaya, and their friendship must necessarily be one kept under cover. But Wanniston could, did, and liked a world alone. He had no intention of letting the world know.

That would be disastrous.

The world would rush to the machine, to partake of its offerings, in order to gain the benefit of the increased intelligence. They would not count the cost—and the cost was great.

The machine produced sterility.

So much for general usage.

But for individual usage? That was another matter. He would use it for himself alone and forget progeny. Wanniston wanted to run the show. He felt entitled to have a hand in it, for he knew that he was better equipped, mentally, to handle the complex problems of running the world than many others. He was aware of man's weaknesses. They were all glad to be just human, but it took a higher intellect to understand that there was something better than just being human.

Wanniston knew that, and Wanniston was going to do something about it. Wanniston, by knowing that there was something higher, and by being just that slight bit higher himself, was going to go all the way and make himself Gerd Lel Rayne's mental equal. He believed that he might even surpass the 260-odd I.Q. possessed by the emissary of the Galactic Ones, for he knew that Rayne was merely the lowest link in a long chain that led right up to the Grand Galactic Council.

"Wait until you see me kid brudder," grinned Wanniston. His lips were thin as he grinned, and there was more sardonicism than genuine humor in the situation.

Gerd Lel Rayne smiled amicably as Wanniston entered. "Good morning," he said with a booming, easy voice. The emissary was a large man, a living embodiment of poise and good will. "I sent for you, John. You're heading for trouble."

"It's my trouble," answered Wanniston.

Rayne shook his massive head slowly. "Not entirely. I'm concerned."

"It's my trouble and, if it blows up in my face, it's my grief."

Again there came that shake of the head. "No, Wanniston, you cannot shake yourself loose like that. You are not alone. I failed my superiors when I told you the tale of Andy Tremaine. I thought that the knowledge of what had happened to another who tried the same thing would deter you. Remember?"

"Yes, I remember. I asked you why it wouldn't be possible to energize the human brain so that it could use the whole thing instead of the usual ten percent. You countered with the yarn about Tremaine."

"Time alone will fill the brain, John. No machine will do it properly. It is forced."

"So?"

"John, you have been using a modification of Tremaine's gadget on yourself. I can only say that you are ambitious to the foolhardy stage. No good will come of it."

"Where is the danger? I care nothing for sterility. I only hope to become as intelligent as you are."

"If that were all," smiled Gerd. "I would look the other way. But again— I could not. For I am responsible for every Terran in the eyes of my superiors. I must try to protect even those who attempt mental suicide. Along that line lies oblivion, Wanniston."

"You do all right," snapped the financier.

"I," smiled Gerd Lel Rayne, "was . . . born to this. I used nothing to enhance my . . . native intellect."

"What's wrong with it, though? I can do without progeny."

"Civilization can not."

"Civilization will know nothing—"

"They will find out. I regret that I tried to dissuade you. In showing you the error of continuing this line of research, I gave you the hint that opened the corridor to you. That was a mistake.

"Be that as it may," continued Gerd, "I must now try to show you more of the future. You are slowly gaining in power, Wanniston, and you will eventually become the most hated man on Terra."

"A shame, I'm sure," snorted Wanniston.

"That attitude will cause you grief," admonished Gerd Lel Rayne. "You should use power wisely, not use it in sharpering your associates out of their rights."

"I've never cheated—"

"Not legally. But is it right for a man to set up traps? Is it good and moral for one of your present mental ability to figure the tertiary causes and effects and apply them to time limits? Not only do you make profit, Wanniston, but you set up your contracts so that you inevitably get forfeit-money as well. You think deeper and plan better—"

"And to the winner goes the spoils," laughed Wanniston. "I should lower myself to their level for the sake of helping them? Not I, Gerd Lel Rayne. I am your equal, and you know it."

"I know it. Yet I am not overly avaricious. I am comfortable, doing my job as best I can. I am unique, perhaps, but I do that which I am best fitted for, and I am helping civilization."

Wanniston smiled. "Tremaine wanted galactic power for Terra. Tremaine wanted the ultimate for mankind. He was a complete altruist, I believe. He wanted to raise the whole world to your level."

"An admirable idea, lacking in certain phases of which he could know nothing. Certain phases, Wanniston, of which you are equally ignorant!"

"I shall find out. I shall, if necessary, surpass you, Gerd."

"Quite possible," smiled the emissary. "Quite possible. The capacity of the brain is almost limitless. My race uses more than yours, Wanniston. Eventually we will fill ours more and more as the centuries pass. But remember that we are as much on the way up as your race is. No one should move too fast."

"Why?"

"Because that way leads to—oblivion."

"Again why?"

"Nature has her safeguards. She knows the dangers of becoming too wise too soon. Therefore she causes sterility. Strange thing, Wanniston, but there is absolutely no way in which to energize the brain without it. One must permit evolution to take its course. One must hope that his sons will have greater native intelligence. Look, Wanniston. Your father, when a boy, played with toys of a technical nature not even known ten centuries before. You as a boy scorned making your construction toy operate as a prime mover with anything so archaic as an atomic converter. You demanded

the prime, the ultimate; the Solar Phoenix in miniature. Nowadays, the kids insist upon using miniature directive-generators.

"Directive power," continued Gerd, "is the daily work. Years ago it took men most of their lives to study it, today the kids play with it in toys. Tomorrow—perhaps one of your race will discover interstellar power—Galactic Power—and your sons and grandsons will demand minute galactic generators to run their gadgets. Ten centuries ago, children were toying with electricity—today they are playing with directives. That, Wanniston, is wisdom gained in the proper way."

"And what should I do?"

"Instead of using your power to gain the world, you might use that intellect to better mankind." Gerd stretched and stood up. "But you will not," he finished. "Your type will not."

"No, I will not."

Gerd led Wanniston to the door, and courteously showed him out. "I hope to see you again," he said honestly. Wanniston nodded; the financier understood. Despite a difference in attitude between the emissary and himself, he knew that having another with an equal intelligence was desirable. Wanniston did not require it, but the emissary was a friend to all, an extrovert, and required friendship.

Wanniston would return. Gerd Lel Rayne was covering something. There was more to Gerd Lel Rayne than met the eye, and he knew it. He understood, with Gerd, all that Gerd said regarding help for Terra in scientific matters. Rayne could advise, could occasionally point out minor errors or make suggestions, but could not openly state facts. Well, Wanniston wanted to know the secret. He'd be back.

Gaya Lel Rayne entered the room and caught her husband's mental distress, slight as it was. She came over beside him and added to the impact of her presence with him the powerful attraction of her. Gerd put a hand on her shoulder and they flowed together momentarily. Powerful were their minds, and powerful was the feeling between them; no Terran could have entertained a bitter thought within several hundred feet of their embrace.

"What is it, Gerd?" she asked.

"Wanniston."

"Still trying?"

"Succeeded."

"Dangerous." It was a statement, not a question.

"Yes—and no," replied Gerd. "He will not willingly pass on his illegal knowledge. Terra would skin him alive if they knew that he was extracting their resources by foul means. Wanniston, on the other hand, knows that he could drag the temple down over all of Terra by merely announcing the machine."

"But isn't sterility enough of a deterrent?" asked Gaya.

"I don't know. Look, Gaya. Those who cared nothing for the future would indulge in mental energizing. They would outstrip those who cared for the future; those with the proper attitude would become slaves, practically. Within a century, every worthwhile thing would be in the hands of those who cared nothing for progeny."

"There is a saving factor," objected Gaya. "The new ones would come from the ranks of those who cared—"

"Of course," laughed Gerd. "But the optimistic philosophy of the Terran would die. One could take his choice. Either he has children or he fits in with those who have forsaken the future."

Gerd dropped his glance and worried visibly for a moment. "It is a gloomy philosophy, Gaya. Slavery or sterility. No future either way. Depressive philosophy—which would lead to planetary suicide."

"Couldn't one have children first and try the machine afterwards?" asked Gaya brightly.

"Uh-huh—but why? Those who wait will be behind those who did not. Of course there will be a place for all, just as there is now. I fear that the race would die out anyway, Gaya. The machine can not be circumvented; its effects may not be counteracted once it is used. Schoolboys and schoolgirls would try it once, throwing away their futures with the youthful willingness to take chances. They would stand above the others in their classes—until their fellows tried it. Forbid it? Like sin, Gaya, you can legislate against it but you can not make it unpopular. Ban it and you will have its effects smuggled in to the youth of Terra—who will try it if only because their folks forbid it. They will see the effects. They will see their parents in slavery . . . Slavery, Gaya, entered into willingly—for the children themselves!"

He faced Gaya with a powerful gesture. "The children will see it. They will decide that slavery is no compensation for parenthood. Why waste time? Why sit in slavery for years while you indulge in the duty of bearing children, and then go to take up the job of making a financial start? No, once this is released, Terra may die."

"Destroy him—and his machine."

Gerd shook his head. "That I can no longer do," he said sadly. "He is our equal now. Tomorrow he will be our superiors, by a minute bit. Yet today he is powerful enough of mind to tell by my actions that I intend to destroy him. I can not—for once I try, I will lose, the Galactic Ones will lose, and Terra will lose. I can call for no help from Terra. I can ask the field representative when he arrives. I might even call for help—"

"It would be justified," said Gaya, earnestly.

"I have done nothing yet. I should try—"

"Try what?"

"I don't know."

Gaya nodded. "Call Yord Tan Verde. He will understand."

Into the penthouse went Gerd and Gaya, to call the field representative of the Galactic Ones. Verde answered at length, and listened to the entire story. He asked a number of questions that Gerd thought to have no connection, but Gerd answered. Then Yord Tan Verde laughed a bit and told Gerd Lel Rayne not to worry.

It was very unsatisfactory.

Will Conan stood up and faced the others at the table. "I won't kill myself," he shouted, banging his fist on the table. "I'll kill him first!"

"I tried that," remarked a tall man at the other end of the table.

Conan smiled wryly. "Peter Wilks tried it, all right," he told the rest. "Tell us what happened, Pete."

"I tried four times. Each time he stopped me in a bold way that seemed to be effortless. It was as though he knew—"

"Well, what else can we do? Can we ignore him?"

"Why not?"

"Is there a man here that does not have his finger in your business?"

Seventeen men shook their heads.

"Is there a man among us that has one microscopic shred of evidence to the fact that Wanniston is dishonest?"

There was not.

"O.K.—so how do we go about it?"

No one knew.

Conan sat down. "We can't squeeze him out, is that it?"

"We can not do anything at all," snarled another man. "No matter what we try, he betters us. He's a sharper. If we try something legal, he's our better. If we get dirty, he cleans us anyway—but the devil does it legally. You can't win."

"There were once twenty-three of us," said Peter Wilks. "Three are in jail—for crimes they did not commit. One is in jail for a crime that he did commit, the crime of trying to frame Wanniston. Two are dead—suicides because they could no longer take defeat after defeat at Wanniston's fine Machiavellian hand. He's a menace."

"We're like the mice that decided to hang a bell on the cat," laughed Conan bitterly. "Six of us have tried and failed. Must we try separately? Can he read minds?"

Wilks jumped to his feet. "I say he can!"

"Then he's more than a menace. He's a devil!"

"So what? We've appealed to Gerd Lel Rayne. And what did he say? He said that we should hang tight because Wanniston was headed for trouble."

"Do we wait until we are all dead before it happens?" snapped Wilks.

"I'm no prophet," growled Conan. "I know this. We're licked. Or is this any good. Can we run him out?"

"How?"

"Superman he may be. Superior to even Gerd Lel Rayne—Sorry, Lel Rayne," he said, seeing the emissary as Gerd opened the door. "You heard?"

Gerd nodded pleasantly. "Wanniston's intellect has increased. A fatal illness. He does not recognize it, nor would he believe it if he were told. Yet it is so; Wanniston's illness has caused an increase in the acuity of the brain, a definite increase in the intelligence quotient. He is quite capable of out-thinking any of you—of us, pardon me. I feel no self-reproach, though. I," and Gerd Lel Rayne laughed heartily—too heartily, though the Terrans did not know it, "have known men of my race who were superior to me, and have no animosity as long as I am well fitted to my position, and can do my job well, better than many others. I may not advance above my present level, yet I can be emissary to Terra where the bulk of my race would find it against their liking."

"Well, suppose you tell us what to do?"

"I don't know," admitted Gerd. "Isolate him. Can you do that?"

"No. He has a finger in every man's business here. We can do nothing unless he is permitted to pass on it. Furthermore, he will find it out in time to circumvent us if we try to operate without his approval. We do that and we land in jail, our life's ambitions stripped from us and dropped into his hands like a ripe plum."

"I know," said Gerd. "I know."

"He's your mental superior too?" asked Wilks uncertainly.

Gerd nodded. "I can try, though. My mental superior he may be, but I am possessed of the knowledge of certain arts of which he knows nothing. That is the heritage of my race; the things I played with as a child. I still . . . occasionally . . . like to play—"

Wanniston entered the basement workshop of Gerd Lel Rayne and watched while the emissary made adjustments on a bit of complex apparatus.

"Tricky gadget," said Wanniston.

"It is that."

"Energy collector—director, converter," said Wanniston. "You're about to release the secret of galactic power?"

"No, I was just tinkering," said Gerd. "I have no intention of telling Terra about it."

"I know about it now."

"You'd tell them?"

"You know better than that."

"Well?"

Wanniston grinned.

And then before he could say more, Gaya came to the workshop room with a group of policemen. "Gerd," she said, "they want to speak to Wanniston."

"Come ahead," called the financier.

"John Wanniston, I arrest you for the crime of murder. I warn you that any statements will be considered evidence."

"Murder? Me? Utterly fantastic!"

The police lieutenant smiled

quietly. "We'll have to ask you to come with us."

"I've murdered who?"

"You'll find out. I may say nothing."

"I've murdered no one!"

"That is for the State to decide—the State and a jury of twelve good men and true."

"Judged by those who hate me? Why should I go?"

"Wanniston, you're a smart man. You must certainly know the implication of any rash move."

"But I'm innocent. Gerd—?"

"I can do nothing. If this is false, you can prove it simply enough. If it is true . . . but why should it be true? You are a smart man, Wanniston. You can get anything you want without murder. That should be considered. I'll help, Wanniston, but remember, as emissary of the Galactic Ones, I must not interfere."

"Removed like a common criminal. I warn you, Lieutenant Alfred, that this is utterly false and I shall have compensation. I am both capable and willing to make you and all others pay for this outrage."

"You'll submit to a lie-detector test?"

"Certainly. I'll take it. I have committed no crime. I have murdered no one!"

Wanniston looked at Gerd Lel Rayne. Gerd shrugged. Wanniston's intellect was most certainly capable of telling the lie detector a lie and making the insensate machine believe it true. Gerd knew that Wanniston knew that—and Wanniston knew that Gerd knew it also. But Gerd was intelligent enough to know that Wanniston was smart enough to avoid murder or running afoul of any man-made law. Any killing would have come up immediately, and the evidence would be natural and honesty a matter of self-defense.

Wanniston was no fool.

They brought in the lie detector and Wanniston slipped the headset on, and grasped the handles.

The lieutenant said: "John Wanniston, did you murder Peter Wilks?"

Wanniston started. *Wilks!*

The magnitude of the plot amazed him. It was as nasty a frame as he could imagine. He knew that it would be as air-tight as the machinations of sixteen men could make it—and he wondered whether the operations of seventeen men might not be more like the truth. Wilks was ruined; had little to live for and knew it. He—and the rest—a sacrifice was not too unquestionable. Their crime—justified by themselves in the thought that better it be one of them than all of them.

Under suspicion himself, any moves he made would be viewed with distrust by the human race, who had cause to know him as the most hated man on earth. Any jury, hearing of his legal trickery, knowing and hearing the account of his masterful moves in business, which gained him fortune upon fortune as other men fell under his steam-roller tactics.

Any jury.

It was their crime, Yes.

But if, as, and when the truth came out—truth? That was another angle and Wanniston cursed himself for not thinking with all of his 375 I.Q. The sixteen did not do it. Wilks must have framed murder out of suicide.

Without letting any of the others know!

For the lie detector would be used on each witness.

Even Gerd.

For he had been apprehended in Gerd Lel Rayne's home.

And Gerd would be asked the standard questions. Foolish, they were; utterly and stupidly foolish. They asked your name; they asked the identity of the suspected one; and—

They asked if the suspected one might be able to outwit a lie detector.

And Gerd Lel Rayne's answer would be a ringing, clear, and damning "Yes!"

This, which takes time to record; to read, passed through Wanniston's mind in no flash of staccato continuity, but as a pattern-plan. It was like thinking of a scotch plaid, or a linoleum pattern to the ordinary mortal; it came instantaneously to the energized intellect of John Wanniston, and he knew the whole futile thing from upper left to lower right before Lieutenant Alfred's voice had ceased to echo through Gerd Lel Rayne's workshop.

He was framed.

He was IT.

And as nicely a nasty bit of connivery as ever hit the sight.

HE was IT.

Wanniston moved with rattlesnake swiftness. He hit the light cord, pulled and twisted. A splurt of sparks came with blackness and Wanniston faded back and down to run, stooped, across the workshop floor avoiding the clutter of machinery and furniture by the faculty of idetic memory.

By sensitivity of mind, he knew where Gerd Lel Rayne kept his spacecraft, and he went there immediately. A *whoosh!* of passing air and Wanniston was in the stratosphere, free and away. He dropped back again a few minutes later to his office where he bundled his mind machine into the spacecraft before he left Terra forever.

Terra.

A planetful of fools. They did not respect his superior intellect. They did not even admit it. They hated him for being able to get that which they could not get, and they resented the fact that he was capable of doing it to their misfortune. They gambled with him—and when they lost, they welshed, like stinking cry-babies.

But Wanniston was smart. He knew where he'd be appreciated. In the galaxy were men of intellect that would welcome him. Give him another month at the machine.

Gerd Lel Rayne. Now he knew the truth about Gerd. Emissary! Magnificent creature; supergenius!

Bah! One whose intellect was moron compared to the Galactic Ones. One who had been placed on Terra because only a moron could be understood by Terrans. The Galactic Ones could understand

Terrans after much painful, wearisome prodding and waiting while the Terrans, idiotlike, stumbled through their clumsy sentence structure. But no Terran could understand the pattern-plan of quadruple-ideas that passed from Galactic One to Galactic One—or even the most careful effort of the Galactic One to be patient and redundantly explicit when and if speaking to a Terran. That is why the inbetween —Gerd Lel Rayne.

Well, Wanniston was far superior to Gerd Lel Rayne, and another month would see him equal to any of the Galactic Ones.

Far, long light-years across the galaxy, Wanniston loafed along, taking accelerated treatments and seeking, idly, one of the main planets of the Galactic Ones. He found one, finally, and slid into the spaceport with all the boldness of a sector governor.

He decided to brazen it out—obviously the ship would be registered and his lack of license papers might be questioned. So he opened the space lock and stepped to the ground to face one of the attendants.

The attendant nodded and waved hands to an approaching crew. They nodded at Wanniston, too, and then swarmed through the ship, servicing it. Before Wanniston was at the registry office, the ship was lifted and slid over to the row upon row of parked spacecraft. Wanniston noted its position and then entered the register.

"Name?" asked the official.

"Wan Nes Stan," said he, putting the Galactic pronunciation to his own name.

"You have the ship formerly registered with Emissary Gerd Lel Rayne. Has he another?"

Wan Nes Stan was stopped momentarily, but his plan to brazen it out laid another pathway. "Not that I know of," he said.

"I'll see that another is delivered to him. You'll not be returning that way?"

"If I do," said Wan Nes Stan boldly, "I shall go in the way I got there before."

"Naturally."

Wan Nes Stan almost gulped visibly. He wondered for a moment whether the Galactic was having sport at his expense, or being sarcastic, or whether he was completely taken in by the boldness.

Wan Nes Stan entered his first Galactic city. To any Terran, it would have been nonunderstandable in scope, but to Wan Nes Stan it was beautiful as it should be, and yet not perfect. Color combinations were there beyond the concept of any Terran, all blended in a mad, ever-moving kaleidoscope of sheer symphony. Faint, stirring music emanated from everywhere—there seemed to be no focal point—and the blend of music with color matched exactly. Either would have been unfinished without the other, and both would have been incomplete without the senses of smell, taste, and feel that were excited ever so delicately.

There was no sign of the bustle and hustle of a mighty city. The indolent and the loafer all moved in a precision pattern that gave the impression of smooth machinery that wasted no motion in accomplishing its end.

Its end?

What could any such perfection need with an end? Was this not the end?

No, Wan Nes Stan knew that this was not the end. This was not perfection, any more than any Terran city was the ultimate in combined beauty and utility. This was not the least of the Galactic cities, nor was it the best. It—was average.

This was home.

He no longer looked down upon the crawling, struggling race of creatures that called themselves *homo sapiens* any more than any Terran looked derisively at a dog. They knew the dog's place in the scheme of things and Wan Nes Stan and the rest of the Galactic Ones knew homo sap's place. There was no scorn in his mind now. The fact that he had once aspired to rule Terra did not appear to him to be a lowly ambition; Wan Nes Stan knew that it was a laudable ambition at one time in his rise—

". . . When he became of age he put away childish things."

Wan Nes Stan checked into a hotel, using his assumed name. It was accepted without question, which pleased him greatly since he had need of procuring some Galactic currency so that he could pay bills. It gave him a place to stay until he could swing a deal, make a move, or steal a pocketfull of whatever the Galactic Ones used for money.

Assuming that the Galactic Ones were running their hotels in a manner similar to Terran establishments, Wan Nes Stan ordered newspapers, a library list, and dinner. Ordering these, he found, was to his liking. There was complete rapport. The steak he ordered by projecting it as a whole, giving the waiter a complete mental impression from sight to texture. It was superb, just as he had pictured.

Then he addressed himself to the papers.

There was no price listed on the paper. He looked. He'd hoped to establish the parity value of a newspaper for price-scaling.

He sought the financial section. There was none. There were sports, news items that interested him not one bit because not one of them pertained to the robbery of anything—the latter would have given him an initial idea of the value of things.

The newspaper was thin and uninteresting. A society column listed the comings and goings of people and their associations. He found among the new arrivals column a notation of his own arrival—sketchy and uninformative—in Gerd Lel Rayne's ship; and a statement to the effect that Wan Nes Stan might be able to give some information as to the struggle of Terra in their advancement to the Galactic state.

The latter was too close to home for Wan Nes Stan. It sounded a little as though he might be known; that his masquerade was understood.

It was.

A knock came at the door an hour later, and as Wan Nes Stan opened the door, the Galactic who stood there smiled and said: "Wan Nes Stan? Formerly Terran of Terra?"

"I . . . must admit it."

"Think nothing of it," replied the Galactic affably. "I am Len Dor Vale, sector overseer."

"My masquerade is known?"

The Galactic laughed. "Known and appreciated. Look, my friend, when the substitute becomes as efficient as the real thing, we no longer look down upon it. You are no longer a Terran, you are as much a Galactic One as the rest of us."

"I am?"

"Aren't you?"

Wan Nes Stan swallowed. "I've considered myself so."

"We don't object."

"I thought you might consider me presumptive—"

"Not in the least!" boomed Len Dor Vale.

"That makes it easier," said Wan Nes Stan.

"Trying to conceal your real identity is both impossible and ridiculous," laughed Len Dor Vale. "Now, Wan Nes Stan, how will you spend your Galactic life?"

"First, how long have I to live?"

"Your super-intellect will, of course, cause subconscious repair of your body. I'd say another six or seven hundred years. You understand, of course, that not being born one of us has cut your life expectancy. That is too bad. But—" and the overseer dismissed the subject with a wave and a shrug.

"I've been a business executive most of my life."

"You may have trouble doing anything of that nature here," said Len Dor Vale with a sad shake of his head. "We are not a competitive race, we Galactic Ones. I might suggest that you try the main line here; overseeing the myriad of uninformed planets comprises the major portion of our lives."

"That seems not too productive."

"No? We have all we need. Anything you want is supplied, you will find. Our philosophy is settled and stable; we are luckily the highest order of intelligence in this galaxy—and that fact we know. In other galaxies near by, we have found no race to compare with us. There are rising races in all of them, but our prime job is to bring about the completeness of this, the First

Galaxy before we struggle with the rest. Our job, Wan Nes Stan, is to co-relate and to advise. Our compensation is the fulfillment of our every desire. We—must carry the burden of all intelligence. We are repaid by those races just below us who are enlightened enough to know what we are doing and who appreciate it.

"Terra is not yet one of these, but another Galactic year and they will be. Our plan is endless, Wan Nes Stan, a project that only we, the Galactics can appreciate in its entirety. You understand the magnitude of any plan of steering a galaxy of races into the full realization of their destiny—and then spreading out through the universe to the countless other galaxies to do likewise.

"The end-product? Yes, you will, as one of us, be able to appreciate this, too. We are still rising, ourselves. We do not know what we may be in another million galactic years—but we do know it will be interesting, and our regret is that we cannot live to see it. Yet our children may, and for them we must plan."

Wan Nes Stan nodded. Certain things penetrated deep during the speech; they rang home with response greater than others; a natural thing. But the one thing that flared in his mind was the statement:

We are not a competitive race.

Wan Nes Stan could and would go far in a culture like this.

"I want to know; how much training is necessary to join the ranks of your governmental service?"

"About a week will suffice. You will then be given an overseer's position. Perhaps you might enjoy being overseer in the sector that includes Sol."

Wan Nes Stan shook his head. "A prophet is not without honor save in his own country," he said.

He considered the idea of overseer's position and scorned it. He'd continue to use the mind machine.

They were still rising.

He could and would rise too. He would rise above them, he could and would become the high governor of all the great widespread race of Galactics. With intelligence above them, he could and would direct them wisely and well, and though none would live to carry his name onward, the name of Wan Nes Stan would go ringing down the halls of time.

But Wan Nes Stan cared little for the halls of time, really. He wanted a present, not a future. That his name might appear as a beacon to uncounted numbers of yet unborn Galactics was attractive; his basic purpose was still to enjoy the power and the glory that would be his.

He wanted the sensuous thrill of having the power that would place him among those whose names still ring though eons have passed.

He began to plan craftily.

"Len Dor Vale, have I your backing?" he asked.

"In two days you have proved yourself most able," agreed Vale.

"I have your backing."

"Need you receive it in words?" puzzled Len Dor Vale. "Must you have acclaim thrust upon you?"

Wan Nes Stan smiled in self-depreciation. "I want you to help me," he said quietly.

Len Dor Vale nodded. "What have you in mind?"

"I want your help in securing me a grand overseer's position."

"We'll see. It might be done."

"Who must we convince?"

"Convince? Only the aptitude machine."

"A machine?" asked Wan Nes Stan.

"Certainly. You are rated on your ability alone, and the aptitude machine has been devised to best select those with the greatest aptitude."

"I see."

Wan Nes Stan said no more. He spent more time in his mind machine, and he took increased and accelerated doses, checking each time to the maximum. He knew his machine to the last decimal place, and in six-hour-periods, Wan Nes Stan energized his brain; increasing its capacity by mighty leaps and bounds.

He took his aptitude test, then, and the result caused mild wonder. His name was bandied back and forth across the galaxy, and he was requested to appear at the great Grand Council of the Galactics.

"Len Dor Vale, what is the real meaning behind this request?" asked Wan Nes Stan, as the message was handed to him.

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AT ALL NEWSSTANDS

"You do not know?" laughed the overseer.

"Frankly, no. I suspect—but again I presume."

"Not at all. No man presumes when his statements and beliefs are fact."

"I have surpassed the tests required for this sector?"

"You have surpassed all tests," smiled Len Dor Vale.

"All tests?"

"All tests. You are to be installed into the office of the Galactic Governor."

"Galactic Governor?" gloated Wan Nes Stan.

"Oh no. Aptitude is not all. Your aptitude is the highest in our race. Therefore you are to be installed in the office of the Galactic Governor as Governor-select."

"And?"

"When your experience-ability factor exceeds that of the Galactic Governor, you will automatically be installed in office. You understand, of course, that higher ability will offset lacking factors in experience, but you must have experience, Wan Nes Stan—a wealth of it. You will gain it by being in the governor's office, working with him, studying his methods, and—well, gaining experience."

"As simple as that," said Wan Nes Stan, brushing his hands.

Len Dor Vale nodded.

"How long will it take?" asked Wan Nes Stan.

"That depends upon you—and you alone. It depends entirely upon the rapidity and accuracy you exhibit in forming correct evaluations."

"I've heard that last remark before," smiled Wan Nes Stan. "A psychiatrist once mentioned that philosophy—personal philosophy is a man's evaluation of personal data."

"Precisely."

Wan Nes Stan nodded complacently. Len Dor Vale then started to help Wan Nes Stan to pack his bag for the long journey across the galaxy to Planet One.

When they raced into space, Len Dor Vale went along as Wan Nes Stan's personal advisor.

"This is routine, but a necessary part of your training," explained Len Dor Vale. "I may as well tell you, I once was selected for a minor post in this office and was subsequently replaced by a better-equipped man. Therefore I know my way around here, and was selected to act as your advisor. Each governor-select enjoys a personal advisor, you know."

Wan Nes Stan smiled quietly. The job was strictly that of a super file clerk. This would not last long and he knew it. With Len Dor Vale's help, he rose swiftly, learning the intricate details with ease. By the month, Wan Nes Stan went from department to department, learning the basic function of each, and when his education was complete, Len Dor Vale took him to meet the governor of the Galactic Council.

"He is ready," said Len Dor Vale.

"I'm glad to meet you," said the governor.

He offered a hand, and as Wan Nes Stan took it, the grip was firm and honest. They shook, and Wan Nes Stan went swiftly over his emotions, asking himself the purpose of this heartiness.

He knew that the Galactic Governor was genuinely glad to meet him. That was against Wan Nes Stan's grain. To greet a possible—no, *positive* successor to such a position was not done with heartiness. It should be done with false heartiness, a completely counterfit facade, behind which false front the machinery necessary to destroy was being brought to bear. Yet Wan Nes Stan knew that no such intent was in the governor's mind. Apparently the Galactic Governor was quite content to be replaced by a better man—and accepted the presence of the better man with good will and friendship.

Wan Nes Stan wondered whether the governor's henchmen might not lead him astray in his experience-gaining program so that he would get a false start, or even useless and detrimental data. His super-intelligence told him that this was not the case. Like all the rest of the Galactics, the governor was willing that a better man be found, and insisted that when, as, and if a better man is discovered, that he be placed properly, even though it meant stepping aside.

It was a philosophy that Wan Nes Stan never entertained. It was completely altruistic. It offered with no consideration of self, the most good for the greatest number. It was a fool's philosophy—but then, all the Galactics were fools.

The governor said: "You have shown a most magnificent level of intellectual aptitude. I congratulate you."

"You have no resentment?"

"Can a man resent that which he knows to be right and honest—unless he himself is unright and dishonest?"

"I suppose not," said Wan Nes Stan. He was safe. Continued use of his mind machine would keep him far and above all comers. "But the usual question comes: What are you going to do?"

"When that time arrives, I will become your aide—unless one better fitted for the position arrives first."

"Mind if I ask how I—"

"Replace me? I don't mind, at all. You replace me whenever you gain sufficient experience to balance your superior intelligence."

"How do I get experience?"

"By being governor," laughed the governor.

"Look," snorted Wan Nes Stan, "prerequisite for the position is experience in the position itself? That's a fool's statement."

"It is the rule of the Galactic Council."

"It remains a fool's rule."

"Is it not sensible," asked Len Dor Vale, "to demand experience before one is given the chance to rule a galaxy-wide civilization such as this?"

Wan Nes Stan could see no real objection to that and said so.

"Then is it a fool's rule?"

Wan Nes Stan thought. It was no fool's rule, really. But instead of making him operate as substitute during the governor's infrequent absences; handling the minor matters of state; and covering the lesser functions and passing rulings on the items of secondary importance, he should be placed in the governor's chair and advised intelligently. This advice should come from experienced men, and as the years rolled on, the advice should become less and less necessary until Wan Nes Stan was handling the entire proposition himself. They were doddling old fools, the entire cosmos of them.

He would change that ruling as soon as he could. There would be some changes made once he became governor—they must be shown the proper way to administrate. After all, it was an accepted fact that Wan Nes Stan had the highest intellect of them all. His judgment must be infallible; his decision would be correct. Their incompetent manner in this matter was an index of their own entire lack of integration. A period of teaching, perhaps, one that would give them better integration of thought, would be advisable.

The governor excused himself as the communicator buzzed, and Len Dor Vale took that moment to draw Wan Nes Stan out of the office. As they passed the door, the governor called after them:

"Good luck, Wan Nes Stan."

Len Dor Vale returned to the governor-select's quarters. "Wan Nes Stan," he said, "you realize that your machine has done its work."

The other nodded. "It has had practically no effect for a couple of weeks, now."

"Your mind is apt. In fact its increase in capacity surpasses even our greatest dreams. But like the untutored genius, you lack the manipulatory facility. Your mind—like the false fiction of the farmer that suddenly composes the brilliant symphony; the unlearned blacksmith that becomes world-acclaimed as a genius with the paintbrush; or the completely untutored grammar-failure that turns up with the galaxy's finest novel—is untrained. You do not want to be a flash in the pan, Wan Nes Stan.

"In order that you use that vast storehouse you have, you must fill it. It is like the galaxy's finest filing system—but it is empty. The drawer files haven't even collected dust, and the cross-index cries for its cards to be notated. Understand?"

"Of course. Intelligence is not sufficient. Experience can and will prepare a man for—"

"Be careful," smiled Len Dor Vale. "In gaining experience one gains also knowledge."

"My mind," said Wan Nes Stan sharply, "has the ability to contain . . . a capacity for learning far above all. I know that the prime factor is the capacity. Without capacity, one cannot fill it with experience and knowledge. But get the knowledge—proper and well-balanced—and experience is really unnecessary."

"Providing that your knowledge is gained from one having the experience. Then you will get experience vicariously. The practise necessary to use that experience will come similarly. You are most fortunate, Wan Nes Stan. I want to know, can you keep yourself busy for a few days? I must make a short trip to a conference. I must not miss it. Can you——"

"I can, and will. I am going to see if I can make a machine that will transfer knowledge and experience from one mind to another. I shall convert my own gadget, here. I will not wait five centuries before I take my next step."

Len Dor Vale smiled in agreement. "I'd suggest that you take some time for amusement."

"Amusement? Spend my time in play when there are things to be done?"

"We think it best to balance the mind's work with the mind's ability to play. You'll find that our fun and games are just as advanced as are our aims and our day's work. You'll not be doing anything childish, Wan Nes Stan."

"Len Dor Vale, I eschewed a future long years ago. I gave up my right to wife and family. Women have little lure for me since all women per se look upon men as possible fathers for their children. Games have as their fundamental concept the desire to excel in the mind or the body as an exhibition of desirability to the female. I shall continue to work."

"Then I'll be returning as soon as I can. Sorry, but it is necessary."

"No resentment," smiled Wan Nes Stan affably. "I can get along."

Len Dor Vale smiled at the governor-select and left. He went to his quarters, packed, and within the hour was on his way into the depths of space.

Two days later, he was given the "come-in" signal at a distant planet on the rim of the galaxy. He dropped his ship quickly and obediently and made his way with deference through the city.

The Galactic waited until he was growing impatient before the attendant signaled him to enter the inner sanctum.

"Before you enter . . . Len Dor Vale, is it? . . . you have the rules?"

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"I have been here before," answered Len Dor Vale. "I have also reviewed the rules."

"Good. Be not disturbed if any of your questions go unanswered. Students will not reveal anything of dangerous nature and will remain silent rather than give false answer."

Len Dor Vale entered the apartment.

"I seek advice and knowledge."

"Ask."

"Wan Nes Stan is about to take his next step."

"I know."

"I ask, will it be violent?"

"There may be violence, but it will not be a major problem."

"Can I prevent violence?" asked Len Dor Vale.

"No."

Len Dor Vale nodded. "He is a violent man. I see no reason why violence should be permitted."

"Could you prevent it? You, admittedly, are psychologist number four among all the Galactics."

"I am here asking your advice."

"What is he doing now?"

"Attempting to convert his machine to a device that will transfer knowledge from one brain to another. He desires that he gain the governor's place as soon as possible."

"He wants the next step to come at once," mused the Student.

"As his psychologist—and number four of all—I know when the next step will take place. I know, or can predict fairly well how Wan Nes Stan's next move will manifest itself. Were I of his mental caliber to five percent, I would block it!"

"Along that road lies danger—cease following that thought!"

"I shall, immediately."

"Wan Nes Stan has obtruded his philosophy upon you already, Len Dor Vale. The next step will take place soon enough that no replacement of you will be necessary, that you know. Completion of his investigations on the conversion of the mind machine will bring about the next step—as you predict—sooner than it would if he were not so single-minded in his purpose."

"Why was Wan Nes Stan permitted to proceed?"

"Every man gets his chance. Every man must be permitted his opportunity to excel as long as he does no irreparable harm."

"His actions on Terra prior to being forced out were not beneficent or benevolent."

"There were no permanent scars," mused the Student. "As for his use of the machine—it has done all Students good. Evidence to the effect that the mind is limitless is valuable, Len Dor Vale."

"But his is not the type that should use such a machine."

"Agreed. One should have a purely theoretical mind before one uses the machine. Otherwise the mind becomes agile and capacious with nothing for it to do. A complete theorist cares nothing for reduction of theory into practice; manipulation of ultra-theoretical concepts into solution is the end-all for us, and the obtaining of impractical mathematics can be handled in a super-energized mind without unbalance.

"But Wan Nes Stan's philosophy includes violence where necessary, and there will be violence. But not dangerous violence. No man can do anything irreplaceably devastating."

"Frankly," offered Len Dor Vale, "I feared that in taking his next step he might take Planet One with him."

"Unless he can control all of the Galactic minds there, he will not cause change in any but himself. Have no fear, even for those within his reach."

"I thank you. I was worried."

The Student nodded, and turned away from Len Dor Vale by a slight amount. The Student's eyes closed part way as he immersed himself in thought. As Len Dor Vale turned to go, the Student aroused himself briefly—long enough to add:

"Wan Nes Stan will take his next step and the Galaxy will be a better place for it."

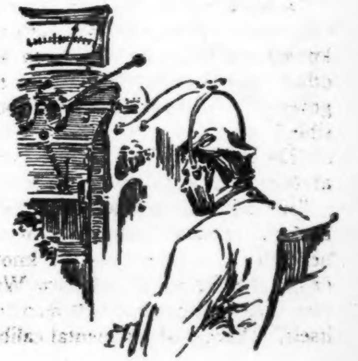
Wan Nes Stan shook his head with annoyance as the machine remained mute. For three days he had been working on it with all of his mind-capacity. In the empty crevasses of his capable mind, Wan Nes Stan was packing enormous quantities of information and education gained on the spot. With perfect memory, he stored the details away and reviewed them with perfection before he tried another change in the circuits of his machine. Sheer reasoning power had failed to solve his problem, not even unreal mathematics served. There was no solution to the problem of how to transfer knowledge from brain to brain.

What is knowledge? he asked himself again and again.

Knowledge is a matter of know-how. It is, in a sense, experience whether original or vicarious. A schoolboy need not perform the generation of calculus in order to study it; the myriad of false trails have been weeded out. Thus schooling can pack a lifetime of learning into a few short weeks by merely pointing the way instead of letting the schoolboy follow all the red-herring trails that the original thinker did. In semantics, the student is offered problems and if he fails to solve them properly, he is immediately prevented from basing other solutions on this false premise—pyramiding his illogic.

So Wan Nes Stan answered himself.

To trace the life-patterns of one brain onto another should not be



hard. Yet no theory would permit it.

And a thought came to the governor-select. What is philosophy?

Philosophy is a man's personal evaluation of data.

Based upon what?

Evaluation of data based upon experience and knowledge and reason.

What is reason?

The ability to extrapolate beyond present experience and knowledge so as to apply the extrapolation correctly to a problem not yet filed in the realm of experience.

Then philosophy is to efficiently apply one's experience in evaluation of data.

And to apply it properly in guiding his actions.

Suppose then, I gain another man's experience and knowledge?

You will then reason like he did.

And your philosophy will be his.

Precisely.

But the Galactics are doddering old fools! With the galaxy at the tips of their fingers, they play games. An ounce of ambition in one of them would put that one in the governor's seat. Yet they prate about adaptability and aptitude and experience and juggle their figures, consult their computing tables and select a man for each job. Has ambition no place?

Ambition is a factor. To not-want the governor's position would reduce the aptitude factor.

Wan Nes Stan left the building where he lived and roamed idly through the streets. Galactics walked in the afternoon sun oblivious to him. Magnificent couples there were, walking through the trees that lined each street, hand in hand, complete in their own exclusive world of ecstasy. Others sat in self-satisfied contemplation of their problems or presented argument to one another on points and theory.

It was a quiet scene that Wan Nes Stan entered. Even argument seemed to be pro-rated and measured in intensity. Of earnest self-belief there was plenty, but on each evidence of self-conviction there was the soft stamp of willingness to permit the other his own belief. There was no scorn for a conflicting thought, but instead there was admiration for the other party, who had mentality enough to entertain a concept—and believe it—that was at variance with the philosophy of the first.

A galaxy full of mild-mannered little rabbits!

A decadent, sloppily-sentimental culture!

A race of men so blind that they could not see what awaited them once they achieved ambition—who were too busy lifting those below to reach above and lift themselves. Lazily satisfied to advance with the maddeningly-slow process of evolutionary development. What did it matter if Terra received no help?

A culture of missionary-minded altruists.

Owners of the galaxy—and so mentally soft that any man could wrest it from them single-handed.

Any man.

And yet he, Wan Nes Stan, who had the drive, the power, and the capability was blocked. Blocked until he could spend five centuries in service to gain the experience necessary. Five hundred years in the second-place chair. Half a millennium of inactivity before he could begin to take that which he should have now!

Frustrated by a machine. Frustrated by a galaxy full of fools!

"Fools!" he said aloud. No one heard him.

"You, there. Fool!"

"I?" asked the Galactic in surprise.

"You are a fool!"

"A concept I have often considered, but if you wish to belabor the point, I'll be most glad to maintain a stout defense."

"You are a fool!"

"Resolved," said the Galactic, "that I am not. You, as affirm—"

"Fool!"

"But parroting is not presenting argum—"

"Fool! You are a fool."

"By what standard?"

"By mine!" exploded Wan Nes Stan. "You are fools! All of you! You sit there idly, watching the years pass, with all the universe before you, and you do nothing!"

"And you can show us the way?" asked the Galactic. "Might I ask your philosophy, friend?"

"I'm no friend to fools. Show you the way? That I can. I am the only one among you that can show you the way—and you sit there and ignore me. That is why you are fools!"

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"Show me and I'll follow," answered the Galactic. "Convince me and I'm your man."

"Bah! One logical, integrated mind in a veritable sea of moronic reason," shouted Wan Nes Stan. "Blocked by ignorance from that which should be mine. Forestalled from my rightful station by sheer numbers—as all great minds are restricted by the blind, mindless, unimaginative imbeciles about him. Blocked and barred from my rightful future—"

Wan Nes Stan leaped forward and snatched the Galactic's hand. He reached forward and clutched the jeweled pin from the Galactic's lapel. He struck the Galactic across the face and started to run from the scene.

Another glitter caught his eye and Wan Nes Stan leaped over to wrest a luminous, jeweled timepiece from around the throat of a woman.

"Give—" he screamed.

And he clutched at a handbag and bore it away in his mad flight.

"—or I take!"

An ornate brooch came free in his hands with a long strip of shimmering, diaphanous silk clinging to the pin. Her companion raced after Wan Nes Stan to remonstrate for the insult, but the madman struck him across the face.

He snatched the ring from the fallen man's finger.

And on he raced, through the bright afternoon sunlight, ever adding to his pile of loot. Galactics clustered behind him, talking to one another, in wondering, unbelieving tones.

But Wan Nes Stan, his lust to strive for power denied him, retreated within himself and substituted the childlike desire for glittering, beckoning things of jewel and credit. Denied even the chance to steal in this world where all was his for the asking, Wan Nes Stan returned to his youth and snatched things that had once been of value to himself and to those about him.

Worthless baubles!

But still he ran, clutching here and there and ever adding to his collection of gaudy junk.

And the final straw came when the Galactics, having no desire to be jostled or beaten, lined the broad sidewalk and quietly unfastened ornaments from jumper or dress or wrist or finger and held it out to Wan Nes Stan as he ran by.

"—I take!" he screamed, and then the scream became a whimper; they took from him the last pleasure of forcing them to part with the baubles and it broke him.

He threw the baubles to the ground. One of the Galactics stooped and scooped them into the handbag and offered it to him.

"I take," he blubbered, and as he saw the proffered bag, his hysteria broke and tears started from his eyes. His mouth pouted and he blubbered and cried like a whipped child. Sobs, deep and lung-shaking gripped his powerful frame and his utter lack of control extended to his motor nerves and he slumped like a rag doll.

Broken in spirit, Wan Nes Stan moved forward through the encircling crowd and left them wondering. They did not follow.

Tears streamed down his contorted face and his steps—laggard and weak—were dotted with drops of moisture as he made his broken way to his office.

He entered wearily, and sat down.

"Wan Nes Stan—megalomaniac!" he said bitterly. He turned at the sound of a step and saw Len Dor Vale watching him.

"Broken," he said.

Len Dor Vale fixed the other man with a piercing gaze. "Sorry," he said. "Quite sorry. But it can not be done that way, you know. The whole proposition was your idea."

"I know," said the other man. He inspected Len Dor Vale's large, well-proportioned frame, his strong features, and his absolute poise and wondered how any man, with all to recommend him, could be so utterly unsympathetic. The coldness in his face set him apart from one of the Galactic Ones. "The proposition was sensible enough—yet I failed. Even though I failed, my manipulations were properly done, you will agree."

Len Dor Vale nodded.

"Where did I fail?"

"You struck a snag."

"It was not my fault."

"Are you crawling?" snapped Len Dor Vale.

"Perhaps," said Wan Nes Stan bitterly. "I want to know how I failed."

Len Dor Vale smiled depreca-

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torily. "Wan Nes Stan, you failed because you neglected to take everything into account. Before you can succeed—before you can hope to plan without failure, you must learn to take everything into account."

"One cannot take everything into account."

"Yes, one can. It is quite possible—if you know how."

"Everything's easy,' said Wan Nes Stan sourly, "once you know how."

"Certainly," laughed Len Dor Vale.

"And because I made a mistake, I'm ruined."

"Had you taken everything into account, you would have known that you could never succeed. You wouldn't have started, and now you wouldn't be a complete and broken failure."

"You may well gloat."

"I'm not gloating," objected Len Dor Vale.

"I believe that," admitted Wan Nes Stan. "But that changes nothing."

"You understand our position, Wan Nes Stan. If we prevented you from trying; well, you might have succeeded, and we'd never know the benefits of your success. It was your idea, and you wanted to try. But don't feel too broken. Others have tried."

"Small consolation. Knowing that another man is starving will not put food in *my* belly." Wan Nes Stan stood up, dusted his jacket carefully, and left the office.

The report of a pistol echoed and re-echoed up and down the corridor, reverberating and hushing until it could be mistaken for a wild cackle of laughter.

THE END.

IN TIMES TO COME

NEXT month brings A. Bertram Chandler back with a featured novelette called "Special Knowledge". You may remember the science-fiction writer George Whitley, who became curiously involved with his character from the future, Quentin Dale, while on convoy duty in the North Atlantic. Quentin Dale showed up on the convoy, due to a slight interchange of personalities—

This time the switch is somewhat different. Quentin Dale did a most excellent job of passing himself off as George Whitley—with improvements such as the disintegrator gun he rigged up—but comes the question: How would a modern steamer officer do as second officer of an interplanetary spaceship?

It wasn't that George Whitley wanted to find out, but that it just happened that way—there he was, supposed to be running a spacer. It might have been disastrous, if it weren't disastrous already. The spaceship had a blown engine, no control, and was headed for unexplored Venus.

The special knowledge of a merchant marine officer might not ordinarily be useful in a spaceship—but in a ship wrecked on Venus, it proved more than a little useful.

THE EDITOR.

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